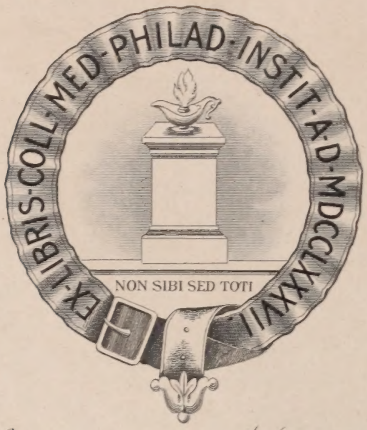
99100 United States ★



Class _____ No. _____

IN EXCHANGE.

2.25

Bound by H. Zinkeisen, Phila.

Digitized by the Internet Archive
in 2014

https://archive.org/details/dentalcosmos6019whit

367

THE DENTAL COSMOS

A MONTHLY RECORD
OF DENTAL SCIENCE

Devoted to the Interests of the Profession

EDITOR
EDWARD C. KIRK, D.D.S., Sc.D., LL.D.

ASSOCIATE EDITOR
L. PIERCE ANTHONY, D.D.S.

VOLUME LX.—1918.

PUBLISHED BY
THE S. S. WHITE DENTAL MANUFACTURING CO.
211 SOUTH TWELFTH STREET, PHILADELPHIA.
1918.

UNIVERSITY OF CALIFORNIA

CONTENTS OF VOLUME LX.

1918.

First pages of monthly issues:

	PAGE		PAGE		PAGE		PAGE
JANUARY	1	APRIL	287	JULY	555	OCTOBER	857
FEBRUARY	101	MAY	381	AUGUST	659	NOVEMBER	963
MARCH	197	JUNE	473	SEPTEMBER	759	DECEMBER	1071

ORIGINAL COMMUNICATIONS.

Aims of the Subsection of Plastic and Oral Surgery 125
Anaphylaxis in Connection with Asthma, Hay Fever, and Various Skin Diseases 1112
Asepsis *vs.* Antisepsis in Root-canal Procedure 491
Apothesin, the New Local Anesthetic: Revised Technique of Pterygo-Mandibular Injection 298
Band of a Gold Crown in the Bronchus: Report of a Case..... 905
Bearing of Physical Anthropology on the Problems of Orthodontia 305
Brief Review of Current Dental Literature 301
Cancer of the Oral Cavity 774
Care of Children's Teeth 911
Careful Technique the Greatest Factor in the Construction of Full Upper and Lower Dentures 876
Case (A) of Nasal and Palatal Restoration 131
Classification of Tissue Conditions in the Mouth as Related to Efficient Dentures 996
Collapse under Anesthesia Due to an Enlarged Thymus Gland 515
Comparison of Office Policies (A) with Special Reference to Pulp Exposure or Death 692
Conduction Anesthesia 1124
Conservation and Utilization of Cicatricial Bands in the Treatment of Jaw Fractures Involving Extensive Loss of Substance 316
Conservation of Approximal Interspaces, Together with the Adjustment of Occlusal Relationships 976
Conservation of Time in Teaching Dental Students 772
Control (The) of Focal Infections..... 963
Conversion of India Rubber into Vulcanite 800
Cysts of the Dental System 555
Dental Anomaly: Report of Case of a Rudimentary Impacted Lower Third Molar 51
Dental Bibliography: The Need of an Index of Periodical Literature 128
Dental Clinic (The) in the National Army Cantonment 704
Dental Clinics in Manila 1115
Dental Engineering and the Normal Arch 483
Dentist or Stomatologist? 980
Dentistry After the War: A Promising Professional Field for Young Men... 806
Diagnosis (The) of Malocclusion in Its Early Stages 789
Effect (The) of Mouth Infection upon the General Health 229
Effects of Decayed Teeth upon a Child's Progress in School 293
Electrobiolytic Theory of Dental Caries: Observations on the Presence of Galvanic Phenomena in the Mouth; with an Annotated Commentary on Related Topics 26
Evolution (The) of Orthodonty 417
Evolution of the Human Face: Chief Stages in Its Development from the Lowest Forms of Life to Man 115
Exercises for the Development of the Muscles of the Face, with a View to Increasing Their Functional Activity 857
"Exodontia" 1006
Experimental and Clinical Study of the Isolated Thyroid Hormone 133
First Line Trench (The) in Dentistry..777
Healthy and Diseased Conditions of the Alveolar Processes of the Jaws..... 426
Hemorrhage and Its Treatment..... 688
Histological Pathology (The) of Alveolar Abscesses and Diseased Root-ends 13
History of the Dental Society of the State of New York..... 793
Impacted Lower Third Molars..... 101

99100 MAY 21 1919

Importance of Dental Supervision During Pregnancy 314
Importance of the Inter-articular Fibrocartilage of the Temporo-mandibular Articulation 512
Improved Method of Casting Splints, and Use of Headgear in Treating Fractured Jaws 602
Indirect-Direct Gold Inlay Method..... 328
Influence (The) of General Health on Oral Tissue 234
Influence of the War on Dentistry and Dental Colleges 1001
Interpretation of Roentgenograms 695
Iodo-Glycerole 50
Logical Asepsis in Dental Practice..... 31
Method of Taking Modeling Compound Impressions with the Mouth Closed and Under Normal Biting Strain 225
Minimum Requirements for Class "A" Dental Schools Adopted by the Dental Educational Council of America..... 701
Movement of Teeth Predetermined by Engineering Instruments: Appliances Designed in Accordance with Analytical Mechanics 39
Nature (The) of Pericemental Abscesses upon Vital Teeth 570
Nature (The) of the Orthodontic Problem 394
Nature's Tolerance and Compensating Adjustments as They Relate to Oral Restoration 986
Needs (The) of Prosthetic Dentistry .. 1108
Next Quarter Century (The) in Dentistry: A Prophecy Based on the Needs of the Profession and Our Hopes for Its Development 1102
Non-cohesive Gold 685
Oral Anesthesia 238
Orthodontic Treatment of Advanced Cases, and Patients Coming from a Distance 45
Past and Present of Operative Dentistry 884
Pathogenesis and Prophylaxis of Pyorrhea Alveolaris 659, 759
Pathology, Etiology, and Treatment of Pyorrhea 574
Pathogenesis and Treatment (The) of Pyorrhea Alveolaris 781
Physiological Age: The Relation of Dentition to Body Growth..... 899
Possible Relationship of Oral Focus to Chronic Osteomyelitis (a Case Report) 147
Practical Sterilization for the Dentist.. 240
Practice (The) of Dentistry in the Army and in Civil Life: A Comparison 504
Preliminary Report upon the Temporomandibular Articulation in the Human Type 505
Presence (The) of Taste Fibers in the Lingual Nerve 217
Primary Factors in the Etiology of Periodontoclasia 1084
Principles (The) of Black's Cavity Preparation 1
Principles (The) Governing the Construction of Permanent Fixatures in the Treatment of Pyorrhea Alveolaris: With a New Method of Construction 671
Procain for Dental Operations..... 966
Radiolucency of Chloro-percha in the Radiograph 433
Relation of Nasal and Oral Sepsis to Systemic Disease and Surgical Conditions Resulting from Focal Infections 1003
Relation of the Surgeon and the Dentist in Face and Jaw Injuries..... 220
Relationship of Oral Secretions to Dental Caries:
(I) Method of Determining the Amylolytic Index of Human Saliva 140
(II) Conditions Influencing the Quantity and Action of the Amylase Content of Human Saliva .. 197
(III) Ferments of Human Saliva Other than Amylase 287
Replanting *vs.* Apicoectomy 473
Report of a Case of Follicular Dental Cyst 319
Report of the Committee on Practice (Dental Society of the State of New York) 893
Restoration of Abnormal Mouths by Surgical Treatment Before Inserting Plates 414
Restorations with Jacket Crowns 402
Rôle (The) of Sepsis and Antisepsis in Medicine 585
Root Amputation (Correspondent's Report, Dental Society of the State of New York) 914
Selection of Anesthesia for Oral Surgical Operations and the Roentgen Ray as an Aid in Diagnosis 209
Simple Form (A) of Removable Bridge Work with Cast Clasps 204
Some Experiences in the Camps and Fields of the Armies Overseas 1119
Standardization of Root-canal Work .. 498
Sterilization of Root-canals 1071
Success in Oral Restoration: What are the Fundamental Principles upon Which It Must be Based? 785
Suggestion (A) for Making Splints in Two Separate Parts and Their Union by Means of a Lock 972
Surgical Correction of a Double Harelip, Alveolar Cleft, and Cleft of Hard and Soft Palate 581
Technique (The) of Making Dental Radiographs 232
Technique (The) of Root Amputation.. 381
Topics of the Day: Curetting, Ionization, Pulp Testing 888
Traumatism Due to Faulty Co-ordinating Bridge Work 321
Treatment (The) of Pyorrhea Alveolaris 992
Trichlorid of Iodin in Dentistry 908

Type of Denture (A) for Army Use .. 516
Type *vs.* Temperament in the Selection of Teeth (IV) 108
Vincent's Angina from the Oral Surgical Standpoint 296
When Shall Root-canals be Filled, and How? 1093

Papers in Society Proceedings.

Engineering Principles Applied to Dentistry 336
President's Address (Dental Society of the State of New York) 809
President's Address (Mississippi Dental Association) 1041
President's Address (New Jersey State Dental Society) 1019
President's Address (Virginia State Dental Association) 1033
War Surgery 1025

CORRESPONDENCE.

Case (A) of Ptosis as the Result of Pulpitis 709
Case (A) of Tooth Gemination 330, 807
Dental Service in France 148
Dentistry as a Career 53
"Iodo-Glycerole" 612
More Anent Standardization 519
Naval Dental Surgeon (The) at Work 434
Procain and Novocain Identical 919
Professional Capability and Dental Commissions 918, 1129
Radiolucency of Chloro-percha.611, 708, 808
Replantation of Teeth 613
Scurvy-like Pyorrhea at "the Front" .. 709
"Self-limiting Action of Sulfuric Acid" 1128
"Septic Teeth: Their Etiology and Surgical Treatment" 241
Sterilization of Tooth Tissues with Silver Nitrate 52
Sulfuric Acid in Root-canals 918, 1127
"Technique of Root Amputation" ..520, 613
Unclean Yet Sound Dentures 52

Dentistry in the War Zone.

(*Illustrations.*)

American Ambulance Hospital at Neuilly, dental department 330
Arrival (The) of the Dentist 1009
Dental Clinic at St. Etienne 1170
"Teaching Oral Hygiene to French Children" 955

PROCEEDINGS OF SOCIETIES.

Academy of Stomatology of Philadelphia 250, 334, 614, 710
Connecticut State Dental Association 815, 1142
Dental Society of the State of New York 73, 809, 920, 1010
Eastern Association of Graduates of the Angle School of Orthodontia 66, 159, 331, 435, 928
Maryland State Dental Association 1130
Mississippi Dental Association 1041
New Jersey State Dental Society ..54, 1019
Northeastern Dental Association.150, 242, 336
Virginia State Dental Association 1033

EDITORIAL.

Classification of Dental Schools 937
Co-operation in Scientific Research 821
Dental Scientific Literature 254
Dentistry in Relation to Reconstruction 1149
Dentistry in the New Era 441
Expansion of the Army Dental Corps .. 935
Greene Vardiman Black Memorial 824
Industrial Dental Service 521
Jesse Cope Green 163
"l'Aide Confraternelle" Honor Roll 348, 624
Oral Sepsis 621
Pending Navy Dental Legislation 344
Professional Appeal (A) 81
Proposed Legislation for Navy Dental Corps 166
Rip Van Winkle, M.D. 1049
Status Præsens (The) 723
Transactions of the Inter-Allied Dental Congress 826

Corrections 524, 1052

BIBLIOGRAPHICAL.

American Illustrated Medical Dictionary 349
Anatomy and Histology of the Mouth and Teeth 625
Army Dentistry (Forsyth, Lectures for the Army Dental Reserve Corps) .. 827
Dental and Oral Radiography 626
Dental Electro-Therapeutics 827
Essentials of Laboratory Diagnosis ... 715
General Pathology and Bacteriology for Dental Students 715
Handbook (A) of Antiseptics 524
Inter-Allied Dental Congress 525
Lord Lister 445
Manual (A) of Dental Prosthetics ... 85
Oral Roentgenology 84
Oral Sepsis in Its Relationship to Systemic Disease 627
Practitioner's (The) Medical Dictionary 84
Principles and Practice of Filling Teeth 1152
Surgery and Diseases of the Mouth and Jaws 257
Textbook on Dental Histology and Embryology, Including Laboratory Directions 626

Books Received 258, 526, 716, 828, 1153

PRACTICAL HINTS, ETC.

Amalgam Restorations for Gold Crowns 95
Application of Silver Nitrate in Root-canal Work 1053
Casting Zinc Electrode Points for Ionization 360
Dental Anomaly (A) 539
Dental Trocar (A) 1154
Safe Way of Using a Separating Disk .. 1158
Use of the Drill as an Aid to Tooth Extraction 1157
Vulcolox Anteriors in the Construction of Richmond Crowns and Bridge Work 939

REVIEW OF CURRENT DENTAL LITERATURE.

Aberrant Thyroid Tumor of the Tongue 943
Acute Suppurative Whartonitis 832
Alcohol Sterilization 529
Alcresta Ipecac 87
Alleged Dental Stigma (An) of Congenital Syphilis 447
Anesthesia and Antiseptics in Plastic Restoration of the Face and Mouth .. 942
Anesthesia and Respiration 355
Aneurysms of the Arteries of the Head and Neck 88
Asepsis and Antisepsis in Modern Dentistry 1059
Autogenous Oral Streptococcal Vaccines in the Treatment of Seventeen Cases of Sprue 942
Bacterial Action of Arsenical Compounds on Experimentally Produced Streptococcic Septicemia 830
Behavior of Hypochlorite and of Chloramin-T Solutions in Contact with Necrotic and Normal Tissues *in vivo* .. 722
Bismuth Poisoning as Affecting the Oral Cavity 451
Blepharospasm Secondary to Pyorrhea Alveolaris 834

Bone-Grafting in Gunshot Wounds of the Mandible 632
Cartilage Transplantation in Extensive Wounds of the Lower Jaw 172
Case of Chronic Nephritis: Uremia: Severe Hemorrhage from Gums 530
Case of Congenital Angioma of the Tongue 169
Case of Meningitis Associated with the Presence of Bacillus Fusiformis 1160
Case of Noma Following Paratyphoid B. 1059
Case of Pyorrhea Alveolaris Treated by Intramuscular Injections of Emetin Hydrochlorid 259
Case of Vincent's Infection, Involving Mouth, Eyes, and Penis 87
Causes of Bad Breath 532
Changes Produced in the Blood by Nitrous-Oxid-Oxygen Anesthesia 633
Clasped Partial Dentures Versus Bridge Work 629
Clinical and Bacteriological Study of the Reinfection of Root-canals, especially After Treatment with Tricresol-formalin and Peruvian Balsam-iodoform 720
Clinical Methods of Treating Hypersensitive Dentin 88
Comparative Efficiency of Local Anesthetics 259
Dental Stigmata in Congenital Syphilis 447
Dentigerous Cysts, with Report of Case 944
Diseases of the Eye from Focal Infection 834
Disinfection of Pneumococcus-Carriers.. 533
Endamœba Buccalis: (II) Its Reactions and Food-taking 262
Experimental Parotitis 1160
Experimental Study of Root-filled Teeth: Preliminary Report 450
Facial Paralysis in a Syphilitic 1160
Facial Paralysis Following Pasteur Antirabic Treatment 91
Few Notes (A) on the Treatment of Gunshot Wounds of the Jaws 172
Fibrin Paper as a Hemostatic Agent .. 944
Fibroma of the Tongue, with Consideration of Other Tumors of the Tongue and Certain Technical Points in Tongue Resections 837
Fifth Cusp (The) and Congenital Syphilis 447
Focal Infection in the Etiology of Skin Disease 836
Frequency of Vincent's Angina 941
Further Experiments with the Use of Bone-Grafts: Abstracts from Recent German Publications 258
Giant-cell Epulis of the Upper Jaw .. 528
Gonococcus Infection of the Mucous Membrane of the Oral Cavity 534
Healing of Lower Jawbone Defects in War Cripples 172
Herpes Zoster a Focal Infection 86
Impressions for Full Dentures, and a Technique 168
Incidence of Chronic Focal Infection in Chronic Diseases 354
Investigation of the Methods of Disinfection Carried Out in Dental Offices 631
Infectious Ulcero-membranous Stomatitis and Gingivitis 534
Ionization Applied to the Treatment of Facial Cicatrices 632
Kidney Infection as a Result of Pyorrhea 449
Leucoplakia of the Tongue 941
Lipoids (The) in Tumors of the Dental System 831
Localization of Streptococcus Viridans 173
Loose Cartilage in the Temporo-maxillary Joint 835
Macroglossia Lymphangioma, with Report of Case 944
Mammillary Eminence (The) of Sabouraud: Its Clinical Significance 447
Maxillo-dental-facial Malformations ... 1159
Measurement of the Force of the Jaws 1058
Menace (The) of Mouth Infections ... 167
Mercurial Stomatitis: Its Pathogenesis, Prophylaxis, and Treatment 86
Methods of General Anesthesia in Facial Surgery 942
Microscopic Anatomy (The) of Chronic Periodontitis and the Pathogenesis of Dental Root-cysts 174
Mixed Tumors of the Salivary Glands: A Study Based on the Experimental Production of Neoplasm in the Submaxillary Gland of the Dog 837
Mobile Bridges 629
Modern English Skull (The) 717
Multiple Primary Malignant Tumors .. 1162
New Case (A) of Heredo-syphilis Nervosa 447
New Continuous-Gum Set 719
Non-union of War Fractures of the Mandible 629
Note upon Mottled Teeth 631
Oculo-cardiac Reflex in Cases of Contractures of the Jaws 263
Operative Treatment of Trigeminal Neuralgia 940
Oral Sepsis and the Anemias 352
Orokinase and Ptyalin in the Saliva of of the Horse 833
Paget's Disease of the Bone 451
Paralysis of the Facialis Caused by Salvarsan 170
Pathogenesis of Infantile Scurvy: An Hypothesis 449
Pathological Anatomy of Epulides 528
Perforating Ulcer of the Hard Palate Resembling Tertiary Syphilis, but Due to a Fuso-spirillary Invasion 1160
Persistent Chronic Apical Inflammation and Its Treatment 169
Porcelain Jacket Crown (The) 260
Present Status (The) of Dental Bacteriology 171
Primary Syphilis of the Gums 529
Progress of the Year in the Investigation of Mottled Enamel, with Special

Reference to Its Association with Artesian Water 831
Regeneration of Bone in the Adult 168
Relation of Chronic Infection to Thyroid Deficiency 264
Relationship of Oral Sepsis to Systemic Disease, and Its Bearing on Treatment 942
Relative Efficiency of Medicaments for the Sterilization of Tooth Structures 531
Relative Germicidal Efficiency of Antiseptics of the Chlorin Group and of Acriflavin and Other Dyes 91
Remarks on Dichloramin-T 354
Retention Cysts of the Mucosa of the Lip 831
Retention of Full Dentures 530
St. Apollonia and Her Picture in the Nidaros Breviary 87
Salivary Calculus 832
Salivary Factor (The) in Relation to Dental Caries 835
Salivary Fistulæ 352
Senility of the Dental Tissues Among Soldiers 452
Septic Parotitis 172
Serological Investigation of Vincent's Angina 449
Significance of Dental Stigmata 170
Significance of the Tubercle of Carabelli 447
Solvents for Dichloramin-T 351
Some Observations on the Replantation and Transplantation of Teeth, with Special Reference to the Patho-histology of the Tissues of Attachment .. 527
Streptococcus Oral Sepsis: Complement-Fixation Test and Value of Routine Blood Examinations 450
Streptothrix Interproximalis—*nova sp.*: An Obligate Micro-aerophile from the Human Mouth 940
Studies upon Dental Caries 173
Study of Some Functional Inefficiencies of Teeth Associated with Occlusal Anomalies 168
Surgeon's (A) Impression of Trigeminal Neuralgia, Based on Experiences with 302 Cases 829
Syphilitic Joint Lesions Simulating Tuberculosis 447
Technique of Wiring Corresponding Teeth of Superior and Inferior Maxillæ in Fracture of Inferior Maxilla 261
Three Bronchoscopic Cases of Dentists' Origin 1158
Three Rare Cases of Replantation of the Teeth 261
Tooth Impacted in a Secondary Bronchus of the Left Lung; Removal by Lower Bronchoscopy 1158
Toxic Factors of Some Common Anesthetics 260
Toxicity of Certain Widely Used Antiseptics 722
Transplantation of Bone 533
Treatment of Cancer of the Lip by Radium: A Report of Twenty-four Cases 632
Treatment of Hemophilia 717
Treatment of Root-canals with Putrescent Pulps 263
True Pruritis Ani: Its Association with Pyorrhea Alveolaris 944
Tuberculoma of the Tongue 171
Tumor of the Gasserian Ganglion 941
Tumors of the Gums 528
Two Cases Illustrating Plastic and Dental Operations 172
Two Cases of Fistula from the Parotid Gland Cured by Resection of the Auriculo-Temporal Nerve 352
Ulcerative Endocarditis, Secondary to Dental Sepsis, Treated by Autogenous Vaccine 833
Unilateral Hypertrophy of the Mandible 633
Use of Heat and Radium in Treatment of Cancer of Jaws and Cheeks 831
Use of Sandpaper in the Preparation of Histologic Ground Sections of Hard Substances 943
Vincent's Angina: Report of a Case ... 1159
War Injuries of the Face and Jaws: Collective Review 1054
Why Chloroform is a More Powerful and Dangerous Anesthetic than Ether .. 170

PERISCOPE.

Advantages of Clasped Dentures 455
Advantages of Nerve-blocking Anesthesia 729
Advantages of Phenol-Sulfonic Acid .. 625
Advantages of Phenol-Sulfonic Acid in the Treatment of Pulpless Teeth 178
After-pain Following Operation 634
Aid for Shoulder Crown Technique 945
Aid in Crown and Bridge Soldering 265
Amalgam Carrier 176
Amalgam Fillings 453
Ambrine 175
Anatomical Occlusion and Articulation in Artificial Dentures 455
Anilin Dye as a Germicide 636
Annealing Lingual Bars 356
Apothesin, the New Local Anesthetic 92, 452, 730
Arch Form 730
Atmospheric Pressure in the Retention of Dentures 357
Avoiding Air-bubbles in Plaster Casts 727
Basic Principle (The) of Fixed Bridge Work 536

Bismuth-Iodoform-Paraffin Paste 634
Bismuth Salicylate for Root-filling 728
Bleaching Teeth 356
Blocking the Ophthalmic Branch of the Fifth Nerve 1060
Caduceus (The) and the Emblem of the Medical Profession 1061
Cancer of the Mouth and Face 839
Care of the Toothbrush 730
Casting Dummies for Bridge Work 635
Centrifugal Casting 635
Chinosol in Root-filling 838
Chlorcosane Apparently the Ideal Solvent for Dichloramin-T 453
Chlorin Antiseptics 947
Clasp (The) as an Anchorage for Partial Dentures 840
Cleaning a Blocked Hypodermic Needle 634
Cleaning Rubber Files 175
Collecting Material for Bacteriological Examination 537
Dark Areas in the X-ray Film 93
Deaths from Cancer 535
Dental Dispensary of Omaha 454
Dental Neuralgia or Pain Referred to Branches of the Fifth Nerve 91
Dental Treatment for Mothers 453
Dentistry Twenty Years Ago and Today 179
Determining the Length of the Bite .. 453
Die and Counter-die for Swaging Saddles 634
Dietetics and Oral Hygiene 840
Extracting Diseased Teeth 839
Filing and Curetting 538
Finishing Dentures 727
Formulary for Full Upper or Lower Impressions 93
Free Dentistry in New Zealand 265
Full Upper Dentures on a Gold Base .. 453
Gold Foil Fillings 946
Gold Foil Fillings for Restoring Tooth Form 177
Good Separating Medium for Plaster Impressions 727
Hall Method of Making Impressions .. 268
"Hard" and "Soft" Teeth 728
Hint (A) on Making Cement 356
Holding a Fractured Jaw for Impression and Adjustment 838
Holding Cotton Rolls in Place While Operating 265
How to Avoid After-pain in Extraction 266
How to Desensitize Teeth that are Sensitive to Scaling 634
How to Fit and Apply Angle's Ribbon Arch 1163
How to Get the Best Results in Casting Watt's Metal Plates with Porcelain Teeth 265
How to Increase Efficiency of Local Anesthetic Solutions 175
How to Obtain a Smooth Finish in Palatal Surface of Vulcanite Dentures .. 838
How to Obtain Smooth Castings 452
How to Prevent Broaches from Falling into the Throat 727
How to Reduce Expansion and Contraction of Amalgam 1061
How to Refit a Rubber Plate Without Vulcanizing 727
How to Sterilize Dentin 727
Hutchinson's Teeth 92
Idiosyncrasy to Dichloramin-T 1060
Importance of a Proper Contact Point 1060
Impression Help 175
Indications and Contra-indications for Local Anesthesia 358
Indications for Gold Fillings 176
Inlay Abutment 1164
Inlay Strengthener 92
Instructions in Re-sterilizing Compound 1162
Interproximal Contact Point 839
Interesting Case (An) of Hypertrophied Tissue 356
Iodin as an Antiseptic 356
Ionization 1060
Ionization in the Treatment of Neuralgia 357
KCNS in Tobacco 267
Keeping Matrix Bands 452
Lancing the Gums in Difficult Dentition 92
Large Amalgam Fillings in Doubtful Teeth 634
Leucoplakia Oris 358
Local Anesthesia for Painless Operating 356
Lysol 634
Maintaining Dryness of Gingival Cavities Without Rubber Dam, Especially Useful with Silicious Cements 841
Making a Plate Prior to Extraction ... 635
Making a Workable Cast 357
Malformations of Jaws and Teeth 1059
Matrices for Amalgam 178, 1163
Matrix 634
Matrix for Synthetic Fillings in Adjoining Approximal Cavities 175
Measuring the Circumference of a Tooth for a Gold Band 945
Method of Filling Root-canals 266
Method of Polishing Vulcanite or Metal Plates 838
Mouth (The) in a State of Health 535
Muscle Trimming 179
Nerve-Blocking 178
New Method for Making a Porcelain Crown 839
New Thought (A) About Making Plaster Models 637
Opening of the Pulp Chamber in Tender or Sore Teeth 534
Orthodontic Nomenclature 267
Outline for Root-canal Technique 537
Paper Points in Cleaning Root-canals .. 534
Paraffin Treatment (The) of Burns.175, 637
Patching Faulty Fillings and Crowns .. 175
Perfect Plaster Impression (The) 94
Plaster Bite for Bridge Work 1164
Plaster Impressions of "Partial" Cases 179
Plaster Models 175
Polishing Material for Dentures 534
Porcelain Inlay (The) 1061
Precautions in the Use of Silicate Cement 728

Preparation of the Mouth Cavity Previous to Dental Operations 535
Preparation of the Tooth at the Gum Margin for a Porcelain Jacket Crown 728
Preparing the Stump for a Crown 535
Prosthesis for Oral Mutilations 841
Psychology of the Child 1164
Pulpless Teeth 838
Pyorrhea Alveolaris 536
Recurrent Dislocation of Lower Jaw .. 1060
Reinforced Silicate Cement Filling 358
Relief of Post-extraction Pain 264
Reliefs in Artificial Dentures 536
Relieving Pain of Devitalized Pulp ... 1162
Removal of Thirty Denticles from One Bicuspid Socket 636
Removing Bad Lateral Root 1163
Removing Blood Stains 356
Removing Mercury Stain from Gold Crown 634
Removing Plaster from Vulcanite Dentures 1163
Removing Root-fillings 536
Removing Silver Nitrate Stains 838
Root-canal Surgery With and Through Antiseptics and Disinfectants 538
Root-canal Treatment a Specialty 535
Root-end Encapsulation 727
Root Surgery 838
School Clinic at North Tonawanda, N. Y. 840
Sensitive Dentin 727
Setting Crowns and Bridges 727
Should the X-ray Diagnosis Supplement or Supersede the Clinical? 265
Silver Nitrate in Root-canals 945
Soldering Contact Points on Inlays and Crowns 1059
Spacing Between Natural and Artificial Teeth 726
Sphagnum Moss as a Surgical Dressing 945
Spatulation of Silicate Cement 727
Sterilization of Instruments 636
Sterilization of Local Anesthetics 945
Substitute for Platinized Gold Backing 176
Surgical Technique of Root Resection in Granuloma Cases 266
Synthetic Technique 946
Taking a Bite for Crown or Bridge Work 840
Taking Impressions with Modeling Composition 92
Technique for Cleaning and Filling Root-canals 455
Technique for Packing Amalgam 359
Technique of Root-end Encapsulation .. 729
Teeth Do Not Control Mandibular Movement 357
Teeth (The) as Foci of Infection 729
Tempering Small Tools 265
Thorough Mastication as an Economic Measure 93
Three Bronchoscopic Cases the Result of Dental Procedure 359
Treatment of Active Hyperemia of the Pulp 177
Treatment of Oral Sepsis 637
Unsterilized Root-canal Instruments .. 635
Uselessness of Vaccines and Emetin in the Treatment of Pyorrhea 177
Use of Arsenic for Destroying Pulps .. 176
Use of Dakin's Solution for Abscessed Teeth 176
Use of the Toothbrush 357
Using Beeswax 91
Variation in the Size of Teeth in the Same Jaw 728
Veronal and Novocain to be Made in America as Barbital and Procain 264
Vincent's Angina 355
Vulcanite Tooth Replacement 535
Wax Inlay Technique 1060
What to Expect and What Not to Expect from a Radiograph 454
Zinc Dies with Zinc Counters 452

OBITUARY.

Lyman Curtis Bryan 457
John R. Callahan 360
Rufus W. Carroll 639
Frank B. Clarke 96
John W. David 270
Isaac Howard Davis 456, 639
Alvin Richard Eaton 638
Major Harold W. Estey 1165
Reuben Hollenback 180
John H. London 640
Geo. A. Maxfield 947
Joseph Lemuel Mewborn 361
James Beall Morrison 269
Robert Hopkins Moffitt 364
Henry B. Nones 732
Louis A. O'Brian 732
Lloyd Allen Osborn 948
Ammon Osgood 842
W. Reinoehl 842
Arwed Retter 540
Francis Leroy Satterlee 96
Robert M. Scott 1165
Burford L. Shobe 180
Fred M. Smith 181, 364
Thomas Cook Stellwagen 731
Leon VanderWhite 842
Wm. Henry Wright 1165
Wm. Mortimer Zirkle 457

DENTAL LEGISLATION AND LEGAL DECISIONS.

Cassius M. Carr Patent Void 734
Dentists' Mutual Protective Alliance Wins in Taggart Case 735
Maine Dental Law Providing for Dental Hygienists 182
Missouri: St. Louis Court of Appeals —Decision in "Negligence in Sterilizing Instruments: Blood Poisoning".. 645
New Jersey: Law Authorizing the Establishment of Free Dental Clinics in Municipalities 644
New York: Oral Hygiene Ordinance for New York City 644
Proposed Legislation for the Navy Dental Corps 365
Provision for the Naval Dental Corps .. 733

DENTAL COLLEGE COMMENCEMENTS.

Atlanta-Southern Dental College 747
Baltimore College of Dental Surgery .. 643
Chicago College of Dental Surgery 846
Cincinnati College of Dental Surgery .. 736
College of Dental and Oral Surgery of New York 741
College of Jersey City, Department of Dentistry 740
College of Physicians and Surgeons 845
Colorado College of Dental Surgery ... 846
Dalhousie University 844
Georgetown University, Dental Department 737
George Washington University, Dental School 641
Harvard Dental School 845
Indiana Dental College 740
Kansas City Dental College 642
Laval University, School of Dental Surgery 744
Lincoln Dental College 740
Loyola University, School of Dentistry 739
McGill University, Department of Dentistry 737
Marquette University, School of Dentistry 849
Medical College of Virginia, College of Dentistry 847
New York College of Dentistry 738
North Pacific College 737
Northwestern University, Dental School 745
Ohio State University, College of Dentistry 736
Philadelphia Dental College (Temple University) 746
Royal College of Dental Surgeons 739
St. Louis University, Dental Department 744
Texas Dental College 643
Thomas W. Evans Museum and Dental Institute School of Dentistry University of Pennsylvania 742
Tulane University, School of Dentistry 844
University of Buffalo, College of Dentistry 849
University of California, College of Dentistry 844
University of Illinois, College of Dentistry 845
University of Iowa, College of Dentistry 949
University of Maryland, Dental Department 848
University of Michigan, College of Dental Surgery 848
University of Minnesota, College of Dentistry 847
University of Pittsburgh, School of Dentistry 641
University of Southern California, College of Dentistry 847
Vanderbilt University, School of Dentistry 642
Washington University, Dental Department 741
Western Dental College 745
Western Reserve University, Dental School 746

DENTAL SOCIETY NOTES AND ANNOUNCEMENTS.

Alabama Board of Dental Examiners .. 553
American Academy of Oral Prophylaxis and Periodontology 657
American Institute of Dental Teachers 99, 551, 1172
American Medical Association, Section on Stomatology 468
American Society of Orthodontists 375
Baltimore College of Dental Surgery—Class of 1913 375
California Board of Dental Examiners 471, 1070
California State Dental Association 285, 378
Canadian Dental Association 657
Chicago Dental Society 99
Connecticut Dental Commission ...470, 1070
Connecticut Dental Hygienists' Association 376
Connecticut State Dental Association .. 99
Delaware Board of Dental Examiners .. 1173
Delta Sigma Delta Fraternity 467
Dental Library Association 283
Dental Protective Association 1068
Dental Society of the State of New York 284
Eastern Association of Graduates of the Angle School 377
Florida State Dental Society 377

Forsyth Dental Infirmary for Children 196
Forsyth Training School for Dental Hygienists 285
G. B. Winter Exodontia Club 758
Georgia State Dental Society 377
Harvard-Tufts Training School for Dental Hygienists 757
Idaho Board of Dental Examiners ..100, 553
Illinois Board of Dental Examiners .. 961
Illinois State Dental Society 284
Indiana Board of Dental Examiners .. 286
Iowa Board of Dental Examiners ..471, 758
Iowa State Dental Society 284
Kansas State Dental Association 195
Kentucky State Dental Association .. 195
Maine Board of Dental Examiners 195
Maine Dental Society 379
Marquette Dental Alumni Association .. 194
Maryland Board of Examiners 471, 1070
Massachusetts Board of Examiners 100, 471, 856
Massachusetts Dental Society 376
Michigan Board of Dental Examiners 379, 961
Michigan State Dental Society 283
Minnesota State Dental Association .. 99
Mississippi Board of Dental Examiners 195
Mississippi State Dental Association .. 375
Missouri Dental Examiners 552, 961
Missouri State Dental Association 283
Montana Board of Examiners ..99, 554, 961
Montana State Dental Society 657
National Association of Dental Examiners 548
National Association of Dental Faculties 375
National Association of Industrial Dental Surgeons 960
National Dental Association ..548, 656, 754
National Mouth Hygiene Association .. 196
Nebraska Board of Dental Examiners.. 553
New Jersey Board of Registration..285, 1069
New Jersey State Dental Society 285
North Carolina Board of Examiners 99, 380, 1173
North Carolina Dental Society 99
North Dakota Board of Examiners .100, 554
North Dakota State Dental Association 467
Northeastern Dental Association 856
Northeastern Massachusetts Dental Society 469
Northern Illinois Dental Society 960
Northern Ohio Dental Association 377
Northwestern University Dental School 284
Odontological Society of Western Pennsylvania 195
Ohio State Dental Society 1068
Oklahoma Board of Dental Examiners 553, 961
Ontario Dental Society 284
Pennsylvania Board of Dental Examiners 379, 1069
Pennsylvania State Dental Society.195, 856
Postgraduate Dental Meeting (Alabama, Mississippi, Texas, Louisiana) 378
Preparedness League of American Dentists 98, 856
Psi Omega Fraternity 194, 549
Rhode Island Board of Registration.472, 1069
South Carolina Board of Dental Examiners 286
South Carolina State Dental Association 284
South Dakota Board of Examiners 100
Susquehanna Dental Association of Pennsylvania 856
Tennessee Board of Dental Examiners .. 553
Tennessee State Dental Association 377
Texas Board of Dental Examiners 470
Texas State Dental Society 194
University of Iowa, College of Dentistry 99
Utah State Dental Society 549
Vermont Board of Dental Examiners .. 553
Vermont State Dental Society 194
Virginia State Dental Association 99
Washington State Board of Dental Examiners 471, 1069
Washington State Dental Society 470
Western Fairfield Co. (Conn.) Dental Society 285
Wisconsin Board of Dental Examiners.. 471

ARMY AND NAVY DENTAL NEWS.

News Notes 97, 183, 272, 367, 459, 541, 647, 748, 850, 950, 1064, 1166
Preparedness League of American Dentists 98, 277, 371, 464, 544, 651, 748, 853, 950, 1062, 1169

Special Notices.

(See pages 281, 373, 463, 545, 654, 855, 959, 1066, 1171)

Monthly Record of Patents Relating to Dentistry.

Patents 100, 196, 286, 380, 472, 554, 758, 962, 1070, 1174

INDEX.

Index to Volume LX 1175

THE

DENTAL COSMOS

VOL. LX. JANUARY 1918. No. 1

ORIGINAL COMMUNICATIONS

The Principles of Black's Cavity Preparation.

By R. R. BYRNES, D.D.S., Richmond, Va.,

PROFESSOR OPERATIVE TECHNICS AND CLINICAL DENTISTRY, SCHOOL OF DENTISTRY, MEDICAL COLLEGE OF VIRGINIA, RICHMOND.

(Read before the Virginia State Dental Association, Norfolk, Va., April 18, 1917.)

I HAVE been asked to talk on the principles of cavity preparation as set forth by Dr. G. V. Black. The subject is so extensive that in a talk of an hour you can readily understand I can simply touch it in its most essential features. In such a talk, therefore, it becomes a matter more or less of my personal viewpoint, founded on some years of teaching, as to what is most important. If I were asked to select the three most essential principles upon which this comprehensive system is built, I should probably answer: First, upon a thorough study and comprehension of the inclination of enamel rods in the different areas of the various teeth; second, upon the extension of cavity margins to areas of immunity, or, as it is usually termed, extension for prevention of the recurrence of decay; and third, the establishing of definite angles at the junction of the surrounding walls with the floors of cavities.

INCLINATION OF ENAMEL RODS.

No scientific cavity preparation can be attained without a thorough knowledge of the structure of enamel and dentin, which of course carries us into the realms of histology. May I, therefore, for a brief space recall to your minds what we learned in our college days, and with the aid of these charts refresh them in what must of course be a very superficial way, with the structure of enamel and dentin, but more especially the former?

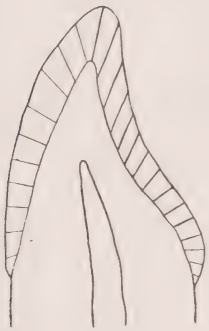
Enamel is composed of rods or fibers held together by an intervening cement substance. The enamel rods in turn are made up of globules or little balls held together in rows or lines. These can best be likened, in a gross way, to the result one would obtain if he were to take small balls of putty or soft clay, and by stacking them one upon another apply just pressure enough to make them

flatten at their points of contact sufficiently to permit of their standing alone. If, now, several of these stacks or columns be placed in close contact, some idea may be obtained of the structure of enamel.

The enamel rods are stronger than the cement substance which binds them together, so that in breaking or cutting the enamel it is inclined to split along the length of the rods. This, then, is known as the line of cleavage, and is a most important feature in cavity preparation.

It is surprising to what extent the general rule applies that *The direction of the enamel rods is from the center of the crown of the tooth toward the surface,* or, to modify this for practical purposes, that *The enamel rods are most commonly at right angles to the surfaces on which they are found.* In every tooth, however, there are certain portions in which the enamel rods approach the surface at more or less of an inclination from such a perpendicular.

Fig. 1.

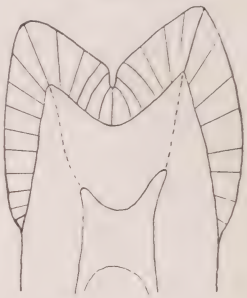


With the aid of the charts I shall endeavor to set these before you.

In Fig. 1 we have represented a central perpendicular section through an incisor. You will note that the enamel rods are cut parallel with their length in all of its parts, but they are not all at right angles to the surface of the tooth. They are nearly so in the central portion of both the labial and lingual surfaces, but as we near the incisal there is sharp inclination in what would seem to be nature's effort to so present the ends of the rods as to best withstand the stress of mastication, or possibly more properly, incision or biting.

Our second diagram (Fig. 2) represents a central perpendicular section bucco-lingually through a bicuspid. In all of its parts the enamel rods are cut parallel with their length, but they do not all stand at right angles to the surface of the tooth. They do so most nearly in the central portion of the buccal and lingual surfaces, but as we near the region of the points of the cusps from both the occlusal and axial surfaces we find considerable inclination of the rods toward the points of the cusps, while in the region of the groove we find an opposite inclination. This, again, seems to be nature's effort to present as strong a "front" as possible toward the source of the stress of mastication.

Fig. 2.



The dotted lines extending from the horns of the pulp to the dento-enamel junction directly under the points of the cusps represent the recessional lines of the pulp, or the path along which the horns of the pulp receded as the tooth developed from its earliest to its present or adult stage. Time does not permit my going into this in proportion to its important bearing on cavity preparation. I can only say that their location in all teeth should be carefully studied.

It is here that unintentional exposure of the pulp very often occurs, for the reason that in the process of the development of the tooth and recession of the pulp this tract is not always completely

closed, and a slender thread of pulp tissue will often persist in the tract.

EXTENSION OF CAVITY MARGINS FOR THE PREVENTION OF RECURRENCE OF DECAY.

In taking up the second great principle mentioned in my opening statement, namely, extension of cavity margins for the prevention of the recurrence of decay, we must again lay a foundation by a short journey into other realms. This time it is pathology.

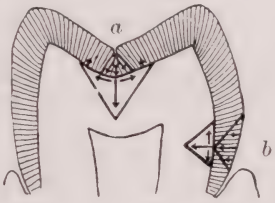
With reference to the manner in which teeth decay, there are two great groups, namely, pit and fissure cavities and smooth-surface cavities. The former are found wherever pits and fissures occur, *i.e.* upon the occlusal surfaces of bicuspids and molars, upon the occlusal third of the buccal surfaces of both upper and lower molars, upon the lingual surfaces of the upper anterior teeth —more often the laterals—and upon the occlusal third of the lingual surfaces of the upper molars where the disto-lingual groove extends over the marginal ridge on to the lingual surface and terminates in a pit. In a word, they are decays starting in structural defects.

Smooth-surface cavities, the other great group, and comprising by far the greater number of cavities, occur, as the name indicates, upon portions of the surfaces of teeth which do not present pits or fissures for the beginning of the process of decay. The process of decay, so far as the dentin is concerned, is identical in both of these groups, but the processes in the enamel are quite different and require different treatment in cavity preparation with reference to "extension for prevention."

Pit and fissure cavities occur in surfaces which are kept habitually clean by the excursions of food and saliva over their surfaces, but which, because of structural defects, permit lodgment of the micro-organisms in the recesses of the pits and grooves. Here they cover themselves with a gelatinoid substance which makes their hiding-place secure, so to speak. Their nest or nidus is thus formed, and they grow and multiply. Their acid products dissolve out the lime salts which hold the enamel rods together, and thus form a channel for the progress of the micro-organisms toward the dentin and a general undermining of the enamel beneath the surface. This is termed backward decay. The only evidence upon the surface of such a process may be a darkened line in the groove or a spot in the pit, pressure upon which with a cutting instrument may cause the surface to cave in.

The process upon reaching the dento-enamel junction finds less resistance here than in the enamel, and the spread is more rapid. Because of the inclination of the enamel rods toward a groove or pit, we have the cone-shaped decay in

FIG. 3.



the enamel here, with its apex toward the surface and its base toward the pulp. The decay penetrates the dentin in the form of a cone with its apex toward the pulp, and its base toward the dento-enamel junction. Someone asks, Why cone-shaped in the dentin? Because the decay had its commencement in the center of the area involved at the dento-enamel junction. The dentinal tubules being entered there first, the micro-organisms penetrate farthest because of their early start. This whole process is shown diagrammatically in the occlusal portion of the tooth in Fig. 3, *a*. The cone is larger in the dentin than in the enamel because the dentin is preferable to the micro-organisms, is softer, etc.

In the preparation of cavities of the pit and fissure group, it is only necessary to remove the enamel covering the area undermined by caries, and form the cavity in the dentin. Further extension for

prevention of recurrence of decay is not necessary, except where it may be required to follow out deep grooves to places where a smooth margin may be given the filling or restoration.

Smooth-surface cavities have their beginnings on surfaces which are free from structural defects. Micro-organisms must therefore attach themselves to the surfaces in areas which are more or less hidden from the excursions of the food and saliva, as in the proximal surfaces, and in habitually unclean areas, left so by scant use of the toothbrush, as at the gingival of the buccal and labial surfaces. An example is shown on the diagram, Fig. 3, at *b*. Here again the micro-organisms collect and cover themselves with a gelatinoid substance, their acid products dissolving out the lime salts of the enamel, but because of the difference in the inclination of the enamel rods as compared with those at *a*, the decay spreads laterally on the surface, each part of the widened area of beginning decay penetrating in the line of the length of the enamel rods, which gives a conical area of decay with the base of the cone at the surface, the apex toward the pulp. This, you will note, is just the reverse of the process at *a*, while the decay in the dentin is identical. Or, to repeat, immediately the enamel is penetrated, decay spreads laterally along the dento-enamel junction in every direction. As each new dentinal tubule is reached, a spreading of the decay along it toward the pulp of the tooth occurs. In the first tubules entered it goes deepest because begun there first, this giving a conical area, as shown at *a*.

The extension of such a cavity as is shown at *b* from the center of the surface far toward the mesial and distal angles of the tooth is so necessary that the rule should be to cut close to the angles in every case, but never past the angles. Herein alone lies safety, for if this is not done, and susceptibility to caries continues, decay is almost sure to recur to the mesial or distal or both, and the filling will be lost. Why to the angles? Because this is an area of natural immunity. I might mention that in a record of ten thousand cases examined in the dental clinic of the Northwestern University at Chicago but nine were found to have caries beginning at these angles of the teeth, and all of these had some natural or acquired fault of occlusion —teeth twisted, not occluding, or abscessed, thereby preventing normal use.

In laying the gingival wall of your cavity you should be guided by the age of the patient. If such cavities are filled in young persons without pushing the gingiva well back so that the margin of the cavity can be extended well under it, the natural shrinkage of the gingivæ as age advances will expose the enamel between the gingiva and the filling.

THE SEVEN STEPS IN CAVITY PREPARATION.

To some of you gentlemen, grown gray in the practice of your profession, it may sound cumbersome when I say that Black's system contemplates seven distinct steps in the preparation of cavities in the teeth. Both from my experience as an accountant and as a dental teacher, I am most willing to subscribe to the principle that "any system is better than none." This in no sense is an apology for the one I am expounding, for if I were not satisfied with its merits I should not teach it. I can go farther, and say, for the comfort of any who will adopt them, that with increased use these steps become almost second nature. We follow their sequence without realizing it, even as we drive our automobiles. I can at this time scarcely do more than recount, and give a brief explanation of each step.

(1) *Outline form.* This, in a word, is the mental picture we form of the area to be included in the finished filling or restoration. Yes, I grant you that we may have cause to change this as we open up the cavity, but is it not better to work with a definite end in view than to just cut and drill away until we conclude "That will do"? Conditions may not permit the preparation of an ideal cavity in many cases, but is it not better to have an ideal toward which to work,

even if we cannot attain it? Outline form, then, is the form of the area of the tooth surface to be included within the outline or enamel margins of the finished cavity. The laying out and cutting to these lines should be the first thing considered and accomplished. Here is where we first have use for our knowledge of the inclination of the enamel rods, as well as extension of cavity margins for prevention of the recurrence of decay. If the cavity be of the pit and fissure class it means, in addition to breaking down all undermined enamel, the following out of grooves to a point where a smooth finish may be given the margin of the filling. If of the smooth-surface group, it means the laying of cavity margins in areas of immunity or those areas kept clean by the excursions of food and saliva over their surfaces.

(2) *Resistance form.* This is the form given a cavity to best enable the restoration or filling to withstand the stress of mastication, and is accomplished in its highest form by combining a flat seat or floor for the filling, cut at right angles to the direction of the stress of mastication—which is usually at right angles to the long axis of the tooth—together with definite angles at the floor junction with the surrounding walls. *A round bur has no place here.* This, then, is our first encounter with the third important principle mentioned in my opening remarks, namely, the establishment of definite angles at the junction of the surrounding walls with the floors of cavities.

(3) *Retention form* is the form given a cavity to prevent the filling from being displaced by such lateral or tipping force as may be brought against it. In simple cavities the retention form is obtained by so placing the opposing walls as to make them strictly parallel, or *slightly*—and I want to accent that word "slightly"—undercut in order that the filling material may be firmly held in place. Retention form is required in its most perfect aspect in proximal cavities on bicuspids and molars, and is made in the form of a step cut over on the occlusal surface in more or less the shape of a dovetail. Let me impress upon you that in the use of this step you do away with unnecessarily deep cavities on the proximal surfaces, and it should always be used, unless, perchance, the tooth which would ordinarily approximate the filling is to be permanently absent. Formerly, pits and grooves were depended upon for retention form, but they have proved "a delusion and a snare." The pot-leg, made usually with a round bur, has no place in modern dentistry.

(4) *Convenience form,* though not of such prime importance as other steps, should not be neglected. It represents certain modifications in a cavity which will render the form more convenient for placing the filling material; often, by cutting a wall to a certain inclination the plugger point will reach some portion, or at a more available angle, enabling the operator to pack gold more accurately and securely in certain otherwise inaccessible parts of the cavity. This is exemplified in the proximal cavity on a cuspid by cutting past the mesiolabial angle somewhat on to the labial surface.

A second order of convenience form consists of slight undercuts (not pot-legs) placed usually in point angles to serve as starting-points for packing gold. A point angle in dentistry is where three walls meet. In proximal cavities they are placed in the axio-linguo-gingival and axio-bucco-gingival angles, and should rarely be placed below the level of the gingival wall. They should be cut at the expense of the buccal and axial, or lingual and axial walls. They should be in the shape of a wedge or cone with its base at, not in, the gingival wall, and tapering off to nothing half-way up the axial wall, so to speak.

(5) *Removal of remaining carious dentin.* Before proceeding to this step the rubber dam should be applied, for should the pulp be exposed in the accomplishment of this operation we find ourselves in better position to master the situation, and proceed in more nearly aseptic surroundings.

Generally, when the cavity has been given the treatment thus far mentioned, there will be no carious dentin remain-

ing, but in the larger cavities it will often be a question whether or not the pulp will be exposed in removing the carious dentin overlying it. Do not, therefore, cut toward the pulp until the cavity is otherwise prepared, as it will then be easier to give an exposed pulp the treatment which may be indicated. When this stage in cavity preparation is reached, any remaining softened dentin may be removed with large spoon excavators. Very often, by working around the edges, a large cake of leathery decay may be lifted off a pathological pulp almost painlessly, whereas the patient would not allow you to "get near it" by going in at the center.

(6) *Finishing the enamel walls and beveling the cavo-surface angles.* If your treatment of the enamel walls thus far has been done with a proper observance of the inclination of the enamel rods, there will remain little to be done now so far as smoothing is concerned, other than running over them with a planing motion with a sharp chisel. When the walls have been satisfactorily smoothed the cavo-surface angle of the enamel should be cut to a distinct bevel outward, also by a planing motion with a chisel, enamel hatchet, or gingival margin trimmer, used lightly. This bevel should include about one-fourth the thickness of the enamel wall, and should be at an angle of from six to ten centigrades from the plane of the enamel wall. The object is to cut away any loose ends of or any unsupported enamel rods which might afterward fall away and render the margin imperfect. We have all seen the dark outline surrounding the *other fellow's* fillings. A second object is to safeguard the cavo-surface angle against possible checking in packing filling material. I am asked so often if this may not be done with small stones and even fissure burs in the engine, that I am going to answer right here, No, not in my hands, for with such an agent I lose that tactile feature which is so valuable in this delicate work. If I were to use a stone at all, it would be an Arkansas stone, and that only succeeding my cutting instruments, for I would value only its polishing characteristics. Sometimes, when the walls are just right, a very fine polishing strip may be used on cavities in the anterior teeth, but this merely supplements, not supplants, the sharp cutting instruments.

(7) *Cavity toilet* consists in freeing the cavity from chips and dust then remaining. This should be done by wiping the cavity in all its parts very thoroughly with dry cotton or spunk held in the pliers. Do not use alcohol, for after drying with the air-syringe something will be left coating the walls.

Let me give you this final rule with all the force at my command: *If, after all the cutting is done, moisture of any kind should enter the cavity, that portion of the cavity should be thoroughly dried and freshened with the cutting instruments.*

PREPARATION OF CAVITIES BY CLASSES.

You will remember I said that with reference to the manner in which they decay, cavities are divided into two groups, pit and fissure cavities and smooth-surface cavities. Now, with reference to the similarity of treatment and instrumentation, they are divided into five classes, as follows:

Class I—Pit and fissure cavities, found wherever structural defects occur.

Class II—Proximal cavities on bicuspids and molars.

Class III—Proximal cavities on incisors and cuspids which do *not* require the removal and restoration of the incisal angle.

Class IV—Proximal cavities on incisors and cuspids which *do* require the removal and restoration of the incisal angle.

Class V—Gingival third cavities—not pit cavities—occurring on the labial, buccal, or lingual surfaces of the teeth.

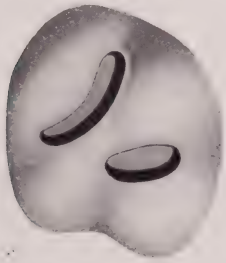
An analysis of this classification will reveal the fact that class I and group 1 are identical, *i.e.* pit and fissure cavities, while classes II, III, IV, and V, comprise group 2, or smooth-surface cavities.

Class I *cavities.* To take up the preparation of a simple cavity of class I (see Fig. 4) in the central fossa of

the occlusal surface of an upper first molar: Such a cavity would come to us with a dark spot as its only outward evidence, while examination with the aid of an exploring tine would reveal the fact that it was more or less undermined—"backward decay" in other words.

To obtain outline form (our first step) a round bur 8/10 mm. in diameter is placed in the pit while in rapid rotation, and the handpiece swayed to and fro to more readily engage the minute blades. A fair amount of pressure is used until the bur enters the dentin. If, however, it does not do so readily, it should be removed and allowed to cool. After entering the dentin it should be

Fig. 4.



removed from the handpiece and followed with a similar bur 1 mm. in diameter, the orifice being enlarged therewith. This completes the use of the round bur, and is its *only use* in the excavation of cavities. Any further opening of the cavity found necessary is obtained with inverted cone burs and hand instruments. The cavity should now be extended to include the sharp slopes toward the pit, without making its floor deeper. This broadening is done by undermining the enamel with an inverted cone bur 8/10 or 1 mm. in diameter. The undermined enamel is then chipped away with straight and binangle chisels and enamel hatchets until the margins are laid in smooth areas, which is all the extension for prevention necessary on this surface, kept habitually clean by the food and saliva.

In this cavity, resistance form and retention form (steps 2 and 3) are obtained together. An inverted-cone bur 1 mm. in diameter, held with its square end against the pulpal wall or floor, is carried entirely around the floor, making a sharp angle at its junction with the surrounding walls. The pulpal wall is at the same time made flat, thereby obtaining the resistance form. Do not make the cavity deeper, merely broader. The cavity should be made as shallow as the removal of all decay and proper seating in the dentin will permit.

No convenience form (step 4) is necessary in so far as access is concerned, though, for a gold filling, one or more convenience points sunk in the surrounding walls only—not in the floor—may be necessary.

It is well to apply the rubber dam here.

In a cavity of this size there is not likely to be necessity for our fifth step, the removal of remaining carious dentin, as it will more than likely have already been freed of caries by our previous instrumentation. If, however, there is carious dentin remaining, it should be removed with spoon excavators 10-6-12.

The next is the sixth step, or smoothing of cavity walls and beveling of cavo-surface angles. This is done by careful paring or planing with a sharp chisel of suitable size, in the direction of the margin of the cavity or around the cavity. In such a cavity as this the inclination of the enamel rods will be toward the cavity, and so the enamel walls may be left parallel with each other without fear that any will be left unsupported, but the cavo-surface angle of the entire margin should be slightly beveled to diminish danger of fracturing the otherwise sharp margin in placing the filling material.

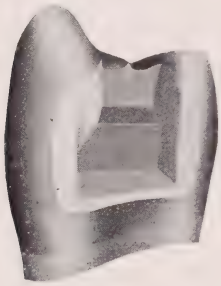
There now remains but one step, the cavity toilet, which, as mentioned before, consists of wiping or sweeping the cavity clear of all dust and débris.

Class II *cavities.* In our bicuspid model (Fig. 5) we have an example of class II, or a cavity on the mesial surface of a bicuspid. Remember that the occlusal surface was intact when such a case presented. Remember also that this occlusal portion or "step" represents re-

tention form, and should not be confounded with extension for prevention, which latter is exemplified in the proximal portion of the cavity by laying the buccal and lingual margins in the immune areas near the axial angles of the tooth.

Outline form. There are three methods of opening into such a cavity. The first plan is to enter the distal terminus of the groove on the occlusal with a bibeveled drill 8/10 or 1 mm. in width, cutting until the dentin is reached. Enlarge with a larger drill or inverted-cone bur. Follow out the groove toward the mesial, sinking it each time to the dentin and drawing to the surface until the mesial marginal ridge is cut through.

Fig. 5.



Enlarge this slot till the dovetail is formed and has been widened and deepened sufficiently at the mesial to partially uncover the decay in the mesial surface.

The second plan is to place a sharp chisel in the center of the mesial marginal ridge, inclining it first toward the buccal and then toward the lingual, repeatedly tapping it with a mallet until a V-shape is cut in the ridge. Enlarge this by the same procedure until the cavity of decay is reached and uncovered. A bibeveled drill may then be placed therein and made to penetrate the dentin. The cut into the cavity may then be made with the inverted-cone bur. After sufficiently enlarging this the bur should be engaged in the dentin close to the dento-enamel junction, pressing it distally along the line of the occlusal groove, the slot, and then the dovetail may be cut in the occlusal surface.

The third plan is to place a separator in position, lift the teeth apart sufficiently to admit chisel No. 10, or the smaller width hoe (6 angle), approaching the cavity from the buccal direction. Its position may be gradually shifted to the occlusal as the enamel is chipped away closer to the marginal ridge, until finally the enamel of the ridge itself may be chipped away by holding the instrument in the occlusal direction. An inverted-cone bur may then be used for opening up the occlusal surface, as in the second method. Do not make the mistake of making the occlusal step too narrow. It should occupy about one-third of the occlusal width of the tooth bucco-lingually. This may be done with repeated underminings with the burs and chipping with sharp chisels.

Because of the inclination of the enamel rods toward a groove, the walls in the occlusal step may be made to parallel each other in the enamel as well as the dentin. In this position the outer extremities of the enamel rods will be at the enamel wall of the cavity, while the other extremities will be resting in the dentin.

In cutting the proximal portion to outline form, enamel hatchets 15-8-12 should be used to trim the overhanging enamel from the buccal and lingual walls. Often the straight and binangle chisels may be used for this. Then the gingival wall is cut with a scraping motion until sound dentin is reached. The buccal and lingual walls should be cut well toward the axial angles of the tooth, the extent being determined by the width of the embrasures, and should be sloped outward, in line with the inclination of the enamel rods in this locality. If much cutting is necessary, it may be accomplished with the aid of a small inverted-cone bur introduced close to the dento-enamel junction about the center of the gingival wall, and cuts made buccally and lingually, squaring the bucco-gingival and the linguo-gingival angles. The bur should then be drawn toward the occlusal in the dentin of both the

buccal and lingual walls, thereby undermining the enamel, which is easily chipped away by introducing the chisels in the buccal and lingual embrasures. The lingual wall should be cut so that its margin may be seen past the approximating tooth when looking across the central incisors at the median line. The buccal wall should be cut to correspond. A very good test is to cut into the embrasures far enough to just permit of the insertion of a chisel, past the approximating tooth, from the buccal and lingual, so that its flat side will be in a plane parallel with the enamel wall. It will be readily seen that this gives a flare to the buccal and lingual enamel walls, made necessary by the enamel cleavage. The strongest seating is given your restoration or filling, however, if the corresponding dentin walls can be made parallel. Do not, nevertheless, cut your cavities too deep in an effort to accentuate this. If your cutting has been correct, the gingival wall in both the enamel and dentin will be on the same horizontal plane. This wall should be laid well past the original contact point, and as near the gingiva as practicable, the best results being obtained if it can be laid beneath it. Beware of leaving any chalky or etched enamel here. The junction of the gingival with the buccal and lingual walls should be sharp and definite in the dentin, but very slightly curved in the enamel.

Resistance and retention form in this cavity require that in the step portion the floor or pulpal wall shall be flat and the surrounding wall parallel, with a slight dovetail effect in outline; in the proximal portion the gingival wall will be horizontally flat, and meet the three upright walls, *i.e.* axial, buccal, and lingual, practically at right angles. The axial wall should meet the buccal and lingual walls at right angles in the dentin, the buccal and lingual walls being as nearly parallel as possible. Of course these latter in the enamel will necessarily flare, as stated before. The squaring of all line angles (wherever two walls meet) is done with chisels and enamel hatchets.

Convenience form in this cavity is accomplished with the cutting of wedge-shaped convenience points at the gingivo-axio-buccal and gingivo-axio-lingual point angles, as described before. Let me impress again that these are in no sense "pot-legs," and are accomplished with the smallest inverted-cone bur, No. 33½, together with chisels or enamel hatchets. These are needed only for starting gold fillings, though they may not be objectionable for plastic restorations.

Any *remaining decay should be removed* with the spoon excavators after first applying the rubber dam.

Fig. 6.

The *walls* should now be *smoothed* and the *cavo-surface angles beveled* in all parts. The latter is accomplished in the proximal portions with gingival margin trimmers having 80 in the formulæ for mesial cavities, and with those having 95 in the formulæ for the distal cavities. A careful examination of these instruments will disclose the logic of this and show how admirably they are designed for this work.

The *cavity toilet* is performed as before.

Class III (see Fig. 6), you will remember, is proximal cavities on the incisors and cuspids which *do not* involve the re-

moval and restoration of the incisal angle. With men of your intelligence and experience it is not necessary to go into their preparation step by step. A careful examination of the illustration herewith will show that, so far as the dentin is concerned, the cavity is given a triangular or wedge shape, with the gingival wall forming the base, while the apex is formed by the juncture, in a sharp acute angle, of the labial and lingual walls at the incisal portion. The axial wall or floor meets these three surrounding walls at right angles, and convenience points are made in the surrounding walls, not in the floor, at the three corners, so to speak. The outline of the cavity in the enamel is more or less oval, not elliptical. This form in the enamel combines a knowledge of the direction of the enamel rods with an observance of the esthetic, which you know teaches that curves are more beautiful than straight lines.

One particular feature to which I would call your attention is the laying of the labial margin well on the labial surface. Here we have a combination of convenience form or access with the esthetic, for it is better to expose to view the unmistakable evidence of a good gold filling than the hidden gold filling which gives to the enamel that discolored appearance so easily mistaken for decay and an ill-kept mouth.

It can readily be seen that the sharp angles and convenience points in the dentin establish undercuts sufficient to make it impossible to dislodge a filling.

Class IV (see Fig. 7) is in principle a class III cavity in which the decay has progressed so far as to necessitate the removal and restoration of the incisal angle. I have set forth the treatment of such a cavity in the model of a central incisor.

Here you will note we have a rather complicated form, and I have chosen it purposely. So far as the proximal portion is concerned, it is prepared, as far as it goes, after the same principle as the previous cavity—the two gingival convenience points included—with the exception that here you will note a slight convexity of the floor or axial wall, in an effort to avoid exposure of the pulp. This makes its junction with the labial and lingual walls a little less than a right angle or more acute. However, the labial and lingual walls are erected in planes which are parallel in the perpendicular, but slightly converging as they extend toward the incisal. This gives the secure wedge form which prevents dislodgment toward the incisal, while the trench, so to speak, which is cut in the incisal edge of the tooth, between the labial and lingual enamel plates, together with the convenience point placed at the distal termination and in the floor of this slot or trench, makes it additionally secure

Fig. 7.

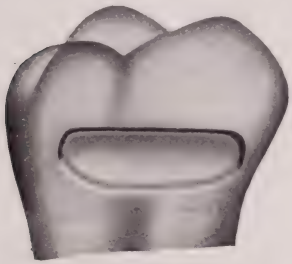
against tipping to the mesial. You will also note that in the incisal step portion more of the lingual plate of enamel is removed than the labial. This is because the stress of mastication is normally from the lingual in the upper anterior teeth. Were this a lower incisor the labial plate would be sacrificed more than the lingual, for the reason that the stress is just the reverse. You will note the "rounded corner" in the enamel at the junction of the proximal with the incisal portions of the cavity. This is to add strength and to prevent fracture with plugger points. Also please note that the incisal step is cut to about the junction of the middle with the distal third of the tooth, which is the point where these respective lobes of the tooth coalesce. This is a weak line, hence we should cut to or past it and not just *nearly* to it. This incisal step or slot

is cut with the smallest sizes of inverted-cone burs which give at once our outline, resistance, and retention forms.

Class v (see Fig. 8) is cavities in the gingival third, not pit cavities, of all the teeth. I am in the habit of referring to these in lecturing to my classes as "filth cavities"—a little strong, perhaps, but it drives home the point that most of these could be prevented by the use of a toothbrush and water four times a day.

I have elected to prepare one of these in my models on the buccal surface of an upper first molar. So far as the principles involved in the preparation of this class of cavities are concerned, they are

Fig. 8.



simple. So far as the practical preparation of this class in the mouth is concerned, these cavities are sometimes most difficult, first because of lack of access, and second because of extreme sensitiveness. The hand instruments will be found less painful than the burs. The first strokes are usually the most painful, but if well and vigorously made, most of the decayed material in the central portion can be removed. This should be followed with a sharp inverted-cone bur about 1 mm. in diameter, passed quickly around the periphery, with its square end resting upon the floor or axial wall of the cavity. Cut these cavities to but not over the angles of the teeth, which you will remember are the immune areas. Remember again that the age of the patient must guide you in laying the gingival margin of these cavities. You may find it necessary to use the square-end fissure bur in squaring up the mesial and distal walls, which are liable to be too much undercut or marred by the inverted-cone bur. These cavities need almost no resistance form, except as it is included in the retention form, for the reason that they are not subjected to any stress. Convenience points for starting gold may be used as required, the maximum number being four, one being placed at each theoretical point angle, but scarcely more than two will ever be found necessary, and often none at all, depending upon the skill of the operator.

I have said so much about extending to immune areas that I want to relate what happens when this practice is ignored. Take, for example, this last cavity (Fig. 8). If the central part is cut out and filled without extension, the growth of micro-organisms will recur on the filling, and being unable to make any impression thereon, the nidus or nest will spread over it mesially or distally, or both, and decay of the contiguous enamel quickly ensues.

CUTTING INSTRUMENTS USED.

I do not feel that my talk would be even nearly complete without some mention of the system of cutting instruments devised by Dr. Black, and the scientific principles on which they are constructed. Time will not permit me to go into the detail of their logical and systematic arrangement, their different uses, etc., but I want to say that, besides having them make a certain number of these instruments, my classes are required to learn, among other things, their arrangement. This is done by class drills wherein some become so proficient as to be able, from the time of a complete disarrangement, to replace each instrument in its proper position in as short a time as four minutes. A complete set consists of 102 instruments; a long set, 51 instruments, and a short set, 25 instruments. The University set consists of 48 instruments, arranged after a definite, logical plan. They are made upon scientific principles, and a descriptive formula is stamped upon each handle. For the straight instruments, as, for example,

straight chisels, this formula consists of but one number, and represents the width of the blade in tenths of millimeters. Thus we have the three straight chisels, 20, 15, and 10, the first being 20 tenths or 2 mm. wide, the second being $1\frac{1}{2}$ mm., and the third 1 mm. in width.

All binangle (two-angle) and triple-angle instruments, with one exception, have three numbers in their formulæ—as, for example, chisel 20-9-6. The first represents the width of the blade in tenths of millimeters, the second the length of the blade in millimeters, and the last is the angle of the blade in centigrades. This last, in a word, represents how much the blade deviates from the straight line of the handle or shaft.

In gingival margin trimmers, the exception referred to, we have four numbers in the formula. The additional one, which comes second in the formula, represents the angle of the cutting edge, which you will note is not at right angles to the long axis of the blade as in all others. Those with 80 in their formulæ are used for beveling the cavo-surface angle of the gingival wall of a mesial cavity, while those with 95 in their formulæ are used similarly in distal cavities.

In addition to these figures, where instruments are made in pairs the additional R or L for right and left is added to the formula.

To paraphrase an old aphorism, it can readily be seen what an immense advantage it is to have "A place for every instrument and every instrument in its place." It can also be seen of what value it is to us in our infirmary work to be able to call for an instrument by name and formula, and have the student hand it to us without a moment's hesitation.

219 N. Boulevard.

The Histological Pathology of Alveolar Abscesses and Diseased Root-ends.

By KURT H. THOMA, D.M.D., Boston, Mass.,

LECTURER ON ORAL HISTOLOGY AND PATHOLOGY, HARVARD UNIVERSITY DENTAL SCHOOL; INSTRUCTOR IN DENTAL ANATOMY, HARVARD MEDICAL SCHOOL.

(Read before the New Jersey State Dental Society, Atlantic City, July 12, 1917.)

THE microscopic study of diseases or lesions is not only of great interest to the pathologist, but of far-reaching practical importance in laying the best foundation upon which to base intelligent and successful treatment.

Alveolar abscesses, caused by diseases of the dental pulp, involve two distinct chains of pathological processes. The first is spoken of as the acute alveolar abscess, and represents a process of destruction in which the tissue is dissolved into pus, while the second is rather of a constructive nature, producing inflammatory new growth in the cancellous part of the bone.

THE ACUTE ALVEOLAR ABSCESS.

The acute alveolar abscess is caused by a large invasion of pyogenic bacteria, and is accompanied by a violent reaction in the tissue. The bloodvessels, after an initial constriction, become dilated to almost twice their size, and leucocytes accumulate along their walls. A serous infiltration with emigration of polymorphonuclear leucocytes occurs in spaces formed between the fibers of the peridental membrane. This causes a rapid increase in size of the membrane, tending to push the tooth from its socket, and gives the impression of an elongated tooth. This phenomenon represents what clinically we call acute periodontitis. If the condition continues, tissue destruction sets in, and we find small necrotic areas. In a comparatively short time the pus collects in larger quantity, and the bone of the alveolar socket becomes involved. The fibers of the peridental membrane swell, but still persist, and not unless suppuration is very active and prolonged

FIG. 1.

Photograph of a skull showing bone destruction due to a granuloma on an upper bicuspid.

do they become destroyed. After the destruction of the stratum durum of the alveolar socket, the surrounding cancellous part of the bone is freely infiltrated with pus, and we have the picture of the acute alveolar abscess. The Haversian canals are next involved, by means of

which the pus finds its way through the outer cortical layer of the bone. The periosteal tissue reacts at once, causing a local infiltration of polymorphonuclear leucocytes and a widespread serous infiltration, which causes large edematous swellings in the cheek or neck. The pus forms first under the periosteum—subperiosteal parulis—which has a remarkable resistance. After the periosteum has finally been penetrated, necrosis continues in the submucosa of the gum, extending to its surface until it forms a fistula, which gives exit to the accumulated pus.

Fig. 2.

Photomicrograph of a root-apex showing the beginning of a granuloma. The inner part shows darker, due to infiltration of inflammatory cells.

After the process of destruction has reached its climax, nature makes an attempt at healing by the formation of granulation tissue. The necrosed cells are dissolved by the leucocytes and either absorbed or expelled through the sinus. Fibroblasts and vascular endothelium are formed to replace the necrosed tissue. Unless the cause is removed, however, destroyed cells and serous or purulent exudation continue to pass through the newly formed tissue to the surface, while endothelial leucocytes and lymphocytes collect in large numbers in the deeper layers of the granulation tissue to counteract the irritating agents absorbed from the exudates. This condition, clinically called chronic abscess, may last for an unlimited period, the discharge from the fistula increasing at times if the process of destruction becomes more marked; or it may become less, or even stop entirely at times, so that the mouth of the fistula becomes closed.

Fig. 3.

Photomicrograph of a tooth-root with dental granuloma. Note the infiltration of inflammatory cells between the fibrous tissue.

Nevertheless, it will reopen with more or less marked subacute symptoms when the suppurating process has overcome the defensive processes of the body.

DENTAL GRANULOMATA.

In contrast to this process of acute inflammation stands the dental granuloma, an infectious granuloma, which is placed pathologically between pure inflammation and neoplasm. It is, however, not a tumor, as the microscopic picture is distinctly that of chronic inflammation.

FIG. 4.

Photomicrograph of a dental granuloma. Note the round spaces in one side of the capsule, indicating fat cells.

FIG. 6.

Photomicrograph of a dental granuloma showing large area of broken-down tissue forming a lumen in the center of the granuloma.

FIG. 5.

Photomicrograph showing root with very large granuloma in a state of subacute attack. Note the broken-down tissue in the center. The specimen shows a large number of polymorphonuclear leucocytes.

FIG. 7.

Photomicrograph of a granuloma with an acute process of suppuration which has penetrated the capsule and formed a sinus into the mouth.

Neither is it a process of pure inflammation, as the injurious agent does not produce actual destruction of the tissue, such as occurs in acute or suppurative inflammation. The lesion represents a reaction to a mildly injurious agent, such as bacteria in small numbers and of low virulence, or chemical irritants, such as formaldehyd, as well as toxins produced by bacterial action. The reaction pro-

Fig. 8.

Photomicrograph of a dental granuloma showing epithelium proliferating in the inflammatory tissue. Note that the epithelial network incloses inflammatory tissue.

duced is of a purely infectious nature, causing proliferation of the fixed tissue elements with round-celled infiltration. The granuloma is formed where the injury occurs, and this is usually at the apex of the tooth. However, if the tooth is perforated at the side of the root or at the bifurcation of a multi-rooted tooth, it results in a lateral or inter-radicular granuloma.

The granuloma increases at the expense of the surrounding bone. After part of the stratum durum of the alveolar socket has disappeared, it grows into

Fig. 9.

Photomicrograph of an epitheliated dental granuloma. Note the epithelium growing on the surface of a cyst cavity at the side of the tooth.

Fig. 10.

Photomicrograph of a granuloma stained with Mallory's phosphotungstic acid-hematoxylin method to bring out the fibrous part of the tissue. Note the strong fibrous capsule. The inner part of the granuloma shows centers where necrosis has taken place.

the medullary spaces, and the lamellæ and trabeculæ of the cancellous part of the bone become resorbed, although oc-

casionally parts are encapsulated in the granuloma. This process may not be restricted to the inner part of the bone, as the outer cortical layer quite frequently becomes involved, especially if the apex of the tooth is situated near the surface of the bone. This is shown in one of the illustrations.

Fig. 11.

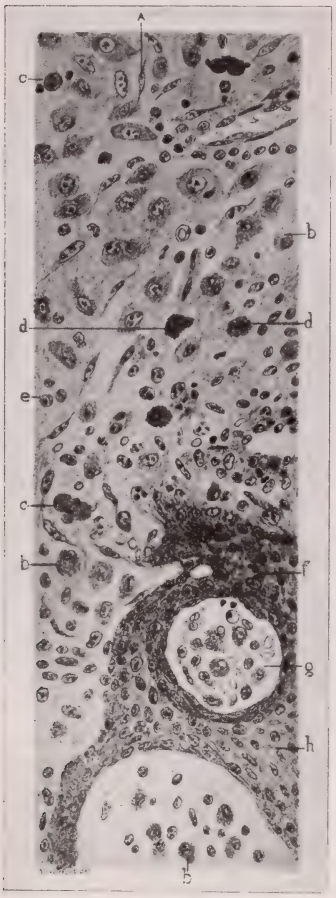
High-power drawing from granuloma shown in Fig. 10, showing the fibrous make-up of the capsule and its abundant blood supply (a-a) leading to the inner part (b).

Simple dental granulomata. The reaction which is caused by the injurious agent consists of a proliferation of the fibroblasts and vascular endothelium of the peridental membrane. The part nearest the source of the injury becomes infiltrated with lymphocytes and a small number of leucocytes, and this focus of inflammation becomes surrounded by a fibrous layer which is continuous with the peridental membrane. Besides the increase in the number of cells in the focus, we have the formation of plasma cells as an important feature. These become very abundant, and are seen as cells with irregular cytoplasm, and from one to four nuclei in excentric arrangement. While all this is taking place the lesion gains in circumference, and while it may occasionally attain very large proportions, it is usually about the size of a pea.

At this stage the simple granuloma is surrounded by the fibrous capsule, which extends into the medullary spaces between the trabeculæ of the bone. This is the reason why, in most cases, the granuloma is held back in the jaw when the tooth is extracted. It is, however, occasionally connected so firmly with the peridental membrane that it is attached

to the extracted tooth. The thickness of the capsule varies greatly. The fibers are arranged in bundles and grow in various directions, as can be well demonstrated with special stains, viz, such as Mallory's phosphotungstic acid-hematoxylin method, or Mallory's anilin blue stain, which colors collagen fibrils and reticulum of connective tissue blue. Vessels and capillaries are abundant among the fibers. Their lumina are often greatly increased, and contain red corpuscles, a granular substance, and occasionally polymorphonuclear leucocytes. The endothelium often shows a proliferating appearance. Besides fibroblasts, we find in this part plasma cells, especially near the vessels, but there are also occasional leucocytes and eosinophils. These studies of the capsule impress on us the great effort of nature to

Fig. 12.



High-power drawing from epitheliated granuloma shown in Fig. 16. a, Fibroblast. b, Plasma cells. c, Hyalin bodies. d, Eosinophils. e, Lymphocytes. f, Leucocytes between epithelial cells. g, Island surrounded by epithelium. h, Epithelial cells.

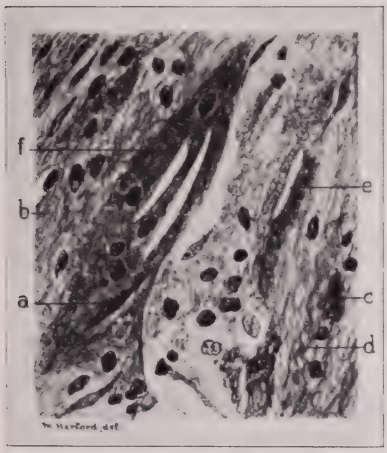
Fig. 13.

High-power drawing from specimen shown in Fig. 7, showing detail of the small side branch of the sinus, which extends toward the apex of the tooth. a, Mouth of sinus. b, Plasma cells. c, Bloodvessels. d, Leucocytes. e. Polymorphonuclear leucocytes. f, Pus cells. h, Epithelial cells.

FIG. 14.

Photomicrograph of a dental granuloma showing abundance of cholesterin spaces. Note also the epithelial band growing on one side of the inner surface.

FIG. 15.



High-power drawing from specimen shown in Fig. 14, showing a number of foreign-body giant cells, f, surrounding two spaces due to cholesterin crystals. a, Fibrous connective tissue bundles. d, Space from another cholesterin crystal.

FIG. 16.

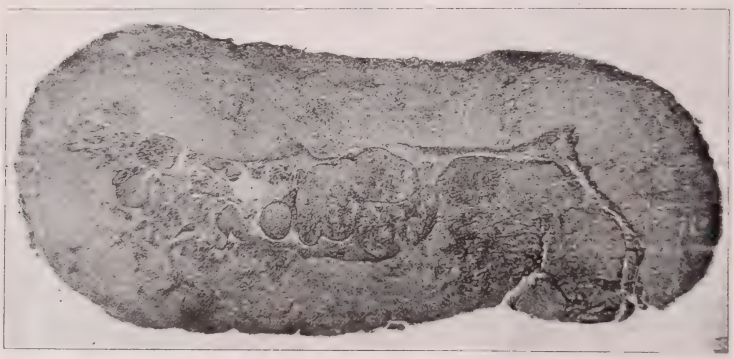
Photomicrograph of a root with granuloma showing a large and a small lumen, the former being entirely covered by epithelium and the latter showing epithelium proliferating over part of its inner surface. This is the beginning of a cyst. Note also the cholesterin spaces.

wall off the seat of inflammation so as to prevent it from spreading into the neighboring parts. It also demonstrates that this capsule does not prevent absorption, as it contains a meshwork of capillaries, and is penetrated abundantly

by larger vessels, thus establishing direct communication between the inner part, the seat of inflammation, and the circulation. Bacteria and toxins may therefore be carried away by the blood stream.

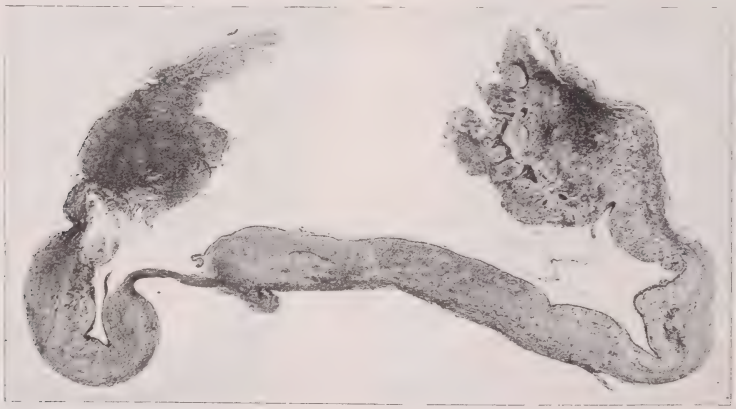
The inside of the granuloma appears at first to be one great mass of plasma cells, but careful examination reveals capillaries, often lined by only a single layer of endothelium. These are especially abundant in young specimens. Besides fibroblasts, which are encountered more or less frequently, we find lymphocytes, especially around the capillaries. Polymorphonuclear and endothelial leucocytes and eosinophils may be found in large or small numbers, according to the special condition which produced the tissue reaction. Erythrocytes are sometimes seen in various parts of the granuloma, and are usually due to the extraction of the tooth, which causes

Fig. 17.



Photomicrograph of cross section through a granuloma removed by apicoectomy. Note the epithelial proliferation in the center of the lesion. Such a granuloma may grow into a periodontal cyst.

Fig. 18.



Photomicrograph of a section through a small cyst sac removed by operation from mandible. The cyst, which was well rounded, collapsed during the process of fixation. Note the epithelial lining of the cyst, which was broken in places during the operation.

a rupture of the extended vessels. The infiltration is generally centered around the apex of the tooth, and the inflammatory granulation tissue quite frequently extends part way into the root-canal, which may explain some clinical observations which interfere with successful root-canal treatment.

Fig. 19.

Roentgenogram of a periodontal cyst which apparently was formed from an epitheliated granuloma at the apex of the devitalized lower first bicuspid.

Epitheliated dental granulomata. Remains of the embryonic enamel organ are often found in the normal peridental membrane of animals as well as man. They can easily be seen under the microscope, occurring in small groups, islands, or chains. The presence of epithelium is not constant in the peridental membrane, and therefore is not regularly found in the dental granuloma. However, if epithelial cells enter into its formation, the irritating influence of the chronic inflammatory condition causes a proliferation, and we find dividing and branching chains of epithelial cells which grow like a network through the lesion. In a section they show as bands of uneven thickness radiating in various directions. The cells of the proliferating epithelium differ in appearance from the cells of the epithelial islands; they become large, and the cytoplasm and nucleus grow more distinct. Leucocytes and plasma cells often invade the intercellular substance which loosely connects the various cells.

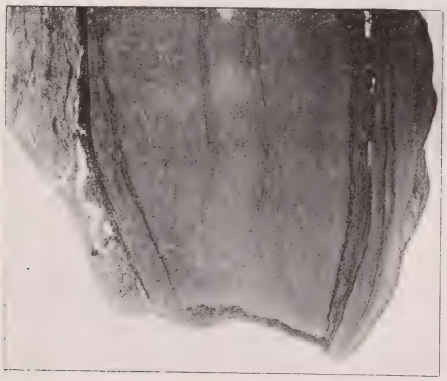
Dental granulomata showing necrosis and suppuration. Quite frequently we find one or two places in the granuloma where necrosis has taken place. A certain number of cells are seen detached from the rest, and are more or less broken down. Polymorphonuclear leucocytes are

then found in large numbers in the capillaries and the tissue where the process of destruction is going on. The pus which

Fig. 20.

Photomicrograph of a root-tip with granuloma. The granuloma is of very fibrous nature, and is stained with Mallory's phosphotungstic acid-hematoxylin method. Note the loss of cement and the rough appearance of the surface of the dentin. Such a condition probably could not be recognized in a roentgenogram.

Fig. 21.



Photomicrograph of the distal root of a lower molar showing absorption of cement and dentin.

is formed is absorbed, and this halts the infiltration of leucocytes, and leaves a space or spaces in the central part of the granuloma. Such a space is called a lumen, and may contain remnants of the decomposed tissue and inflammatory excretions from the root-canal or remaining part of the lesion. The process of suppuration is usually caused by bacteria which emigrate from the root-canal or are forced into the granuloma through instrumentation. It is seldom very severe, and is usually taken care of by the defensive forces of the body, which cause absorption of the pus. Occasionally,

Fig. 22.

High-power drawing from specimen shown in Fig. 21, showing the dento-cemental junction and absorption of the tooth substance by osteoclasts.

however, the destructive process becomes more extensive, tearing down the fibrous encapsulation, and forming a sinus to the surface of the gums or face. Such a subacute alveolar abscess eventually involves the surrounding tissues, and is not clinically very different from the acute attack.

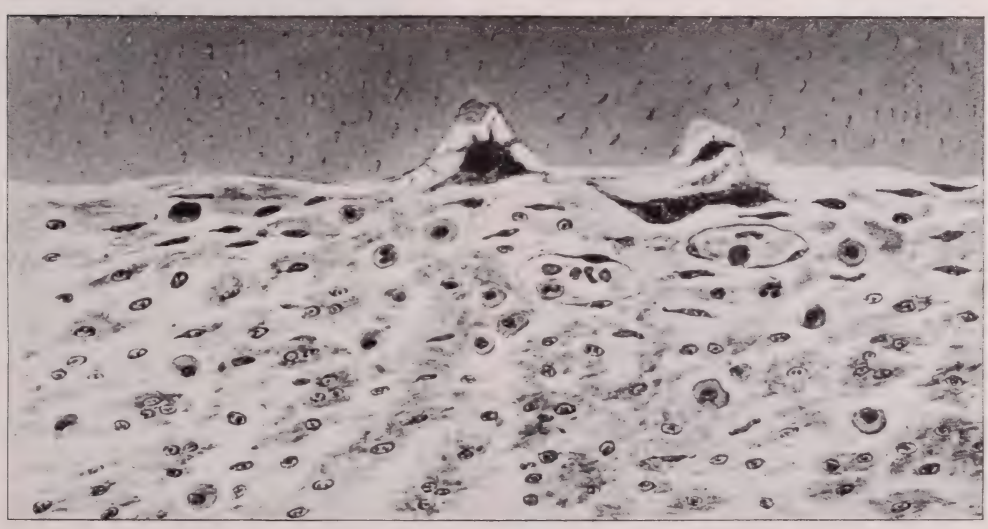
Dental granulomata showing cyst formation. If necrosis occurs in epitheliated granulomata we find that the epithelial strands have a tendency to grow between live and necrosed tissue, sometimes giving the appearance of an

endeavor to encapsulate the tissue which has become destroyed. Such epithelial

Fig. 23.

Photomicrograph through section of roots of a lower molar with granuloma through both apices. Note absorption of the root-end of the distal root.

Fig. 24.



High-power drawing from specimen shown in Fig. 23, showing oblique section through dentin and infectious granulation tissue of the granuloma, with osteoclasts causing absorption on the surface of the dentin.

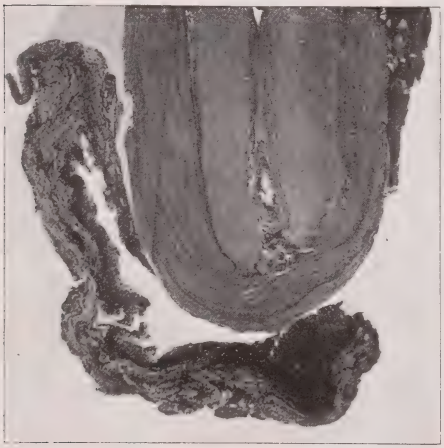
linings may actually be found to cover the entire inner surface of the lumen of a granuloma, which must be looked upon as the beginning of a periodontal or radicular cyst. The exudates accumulating in the lumen cause extension of the

cyst, which may grow to the large size with which we are more familiar clinically. A careful study of the history and pathology of this type of bone cyst shows that they are of infectious nature. Roentgenographic examinations give further evidence of this by demonstrating that such cysts are almost always connected with a devitalized tooth, except in cases where the tooth has been extracted without removing the epithelial granuloma or the partly formed cyst.

Fig. 25.

Photomicrograph of a root-end with granuloma showing a great deal of absorption of both cement and dentin.

Fig. 26.



Photomicrograph of root of a lower molar showing hypercementosis. The new layers of cement have apparently covered the apical foramen.

Dental granulomata showing various retrograde processes. Besides necrosis and suppuration we find most frequent evidence of cholesterin formation, especially in old specimens and periodontal cysts. Cholesterin crystals can be recognized by the rhomboid spaces left by the crystals which dissolve during dehydration in alcohol. They can be demonstrated, however, in frozen sections, in which they appear as brownish crystals. Foreign body giant cells frequently surround one or more of these crystals, as seen in one of the illustrations.

Fig. 27.

Photomicrograph of apex of a tooth with granuloma. Note that the granulation tissue extends into the root-canal, and that the apical part of the root-canal has been covered by layers of new cement.

Occasionally fatty degeneration occurs, usually at the periphery just inside the

fibrous capsule, and collagen is often formed by the fibroblasts in large quantities from the fibrin of the inner part of the granuloma. This can be well demonstrated by Mallory's anilin-blue stain, which stains the fibrin and fibroglia fibers red and the collagen blue. Hyalin is found quite frequently. It accumulates in drops of various sizes in the cytoplasm of the plasma cells—Russell's fuchsin bodies. Often the entire cell is so filled with hyalin that the nucleus is pressed to one side, and nothing remains of the cell but the acidophilic hyalin bodies and a crescent-shaped nucleus.

All of these retrograde processes are shown in one or the other of the dental granulomata studied.

THE EFFECT OF ALVEOLAR ABSCESS ON THE ROOT-ENDS.

Acute or chronic inflammation of the peridental membrane, when of long standing, leaves its mark on the apex of the root.

Necrosis of the root-end. If the apical part of the peridental membrane has become destroyed, or if its blood supply has been disturbed, we have a condition which entirely inhibits the metabolism of the tooth. The cementum, which is porous, then easily absorbs the products of inflammation, and becoming infected, forms an obnoxious foreign body, which nature tries to eliminate. Absorption starts at the surface, and soon the cementum presents a roughened appearance, but this is too minute to show in a roentgenogram. It is, however, easily recognizable under the microscope. Occasionally the infection penetrates the cementum at some point, and spreads rapidly between the dentin and cementum in a peripheral direction. More frequently, though, we find that osteoclasts form in large numbers along the surface of the tooth, producing well-marked indentations. The osteoclasts are of irregular and varying shapes, with one, two, or more nuclei. They are often connected with the tooth surface by fine processes. The absorption of the tooth root is very slow, and differs somewhat from the same condition occurring in bone. There the necrosed portion may finally separate and be expelled as a sequestrum, while in a tooth we find gradual absorption of only the root. It starts at the apex, soon involves the dentin, and makes rapid progress between the lamellæ of the cementum, and at the dento-cemental junction. After a certain amount of the apex of the tooth has disappeared, we can easily diagnose the condition by means of the Roentgen method.

Hypercementosis. The fibers and cells of the peridental membrane have a wonderful resistance to disease. The cementoblasts very often remain vital, and are stimulated to activity by the irritating influence of chronic inflammation. This may result in the formation, layer upon layer, of new cementum, which causes a considerable enlargement of the contour of the apex of the tooth. Even after a considerable portion of the cementum and dentin have been destroyed, we may get new formation of cementum, and in sections we often find evidences of large absorbed areas extending deep into the dentin, and filled in with new cementum. Cementum may even be found completely lining the inner surface of the root-canal, as seen in one of the illustrations.

43 Bay State Road.

Electrobiolytic Theory of Dental Caries:

Observations on the Presence of Galvanic Phenomena in the Mouth; with an Annotated Commentary on Related Topics.

By PAUL R. MANNING, D.M.D., Springfield, Mass.

THE relation of electro-activity to physiologic processes is food for conjecture and the source of fruitful experiment. Evidence of the production and effect of electric currents in the course of physiologic function, and consequent upon injury and disease, has been deeply studied. The existence of differences of potential in injured parts has been demonstrated in the experiments of DuBois-Reymond (1843)[1] and others. It is interesting to note that while caries of the teeth has brought about all manner of speculation through the ages, and, in the period of a generation, much scientific investigation, all of which has been embodied in a number of careful summaries,[2] there has been no weight attached to evidences of profound electro-activity in the mouth amid approximately perfect conditions for its maintenance.

EVIDENCE OF ELECTRO-ACTIVITY IN THE MOUTH.

Nearly every observer is familiar with "shock" produced by metallic intrusion upon fillings under examination, the most common manifestation of galvanism met with in the mouth. Expressed in terms common in the usage of physiologic research, such a current appears tremendous, but its chief significance is in its indication of the electrolytic qualities of the saliva.[3] There is evidence, however, that the presence of a foreign dissimilar metal is not an essential to the institution of galvanism and resultant electrolysis in the mouth. Essig[4] noted that the presence of a silver band about

[1] "Untersuchungen über thierische Elektricität," DuBois-Reymond, 1848–1860. Investigation of the "demarcation current" or current of injury. The cut end of a muscle is electro-negative as related to the lateral uninjured surface.

[2] "The Etiology of Dental Caries," Kirk, DENTAL COSMOS, 1914. This may not have been intended as a summary by its writer, but is probably the most excellent review up to that time, as well as presenting original views fully on a par with earlier work. (See also Cook and Johnson, in "Johnson's Textbook of Operative Dentistry.")

[3] *Electrolytes.* It is generally accepted as probable that when certain substances are placed in solution their molecules undergo dissociation. The two or more parts are called ions. The completeness of dissociation and possible regrouping is, roundly speaking, in direct ratio with the amount of dilution of the solution. Such substances are called electrolytes in distinction from some others which do not undergo dissociation when in solution. The ions are supposed to undergo a definite regrouping in transitory paths, carrying with them the electrical charge—negative or positive—peculiar to them as ions. In the light of consideration of osmotic pressures, which is a necessary matter in dealing with dentinal structure, this principle attains very considerable importance, as an ion must be credited with as much osmotic pressure as a molecule. The saliva being a solution of electrolytes, it follows that the osmotic pressure will increase in the mouth in just that proportion to which the suspended electrolytes are dissociated. (Acids, bases, salts, and certain other substances under some conditions become ionized, *i.e.* they are electrolytes.)

[4] Essig, "American Text-book of Prosthetic Dentistry," 1907. ". . . . was probably due to galvanic action between the silver support and the tooth structure."

a tooth caused erosion of adjacent tooth structure, and he inferred that galvanism was the responsible force, although it seems he offered no explanation of the polar quality which must have been exhibited by the tooth structure, holding it to be self-apparent. In his observation is the essence, unstated, of the hypothesis which both concedes and overthrows some of the older theories of dental caries.

In 1912 the writer observed a case similar to that described by Essig. Since then a difference in potential has been recognized in mouths where caries is active, but where no foreign bodies are present. This current was determined experimentally by means of the capillary electrometer,[5] and with its detection came the promulgation of the hypothesis that as there is in mouths where active caries is present a noticeable difference of potential, there is a consequent electrolysis, and an action in progress upon the polar electrodes. The factors which determine the constancy of the presence and strength of the phenomenon are not concerned in recognition of the principles at work.

FACTORS IN THE INSTITUTION OR MODIFICATION OF ELECTROLYSIS IN THE MOUTH.

Under detailed consideration of the passage of such a current, whether a tooth[6] is to be regarded as a whole as a positive pole (as its elements would indeed indicate it to be), whether the enamel is to be considered slightly more positive than the adjacent dentin through a fissure or an abrasion, or the cementum slightly more negative than either, or *vice versa,* the point remains that there is in progress an electrobiolytic action very largely responsive to obscure variations in mouth conditions.

The views held in the light of modern scientific philosophy relating to osmotic pressure,[7] and ultimate diffusion against odds under prolonged sustenance of pressure, appear to coincide with the theory held regarding a constant action, however nearly infinitesimal, long continued.

The presence of galvanism holds still further significance when we consider the remarkable activity of colloidal substances in acidulated media, and the probable relation of the theory properly ascribed to Miller dealing with the activity of acids in caries to the principles of electrolysis and osmosis. It has many times been contended, even in the same discourse that lauded the work of Miller as a possible answer to the whole question, that his theories left something to be desired, and indeed it is a too improbable idea that the action of the mouth fluids alone might cause disintegration of the teeth. While the work of Miller and that of Michaels remains incontestable as to its actual data, it is in theorizing and the hope of discovering some one cause that there appeared an error, or at least a disposition to advance ideas not easily acceptable. Miller expressed in his later papers—before his death in 1907 he appeared to embrace

[5] A combination in circuit of a vertical glass tube drawn into a fine capillary and holding mercury, the lower end of the tube supported in a sulfuric acid (dil.) bath in the bottom of which vessel is a layer of mercury. The mercury is put in circuit through the sides of the two containers with the articles whose difference of potential is to be noted, and a microscope used to note the fluctuations. The mercury in the capillary moves in the direction of the current upon momentary contact. The string-galvanometer would probably be a preferable instrument, but the writer had none at his disposal.

[6] The cations are H, Na, K, Ca, Mg.

[7] See footnote 3. It may be mentioned that it appears that substances which exert a definite osmotic pressure when in the body exhibit no such property when isolated, and Reid (*Journal of Physiology,* 1905) supposes that in the body proteins are closely allied with certain other unknown substances whose nature is either so obscure or so delicate that any attempt to isolate them would necessarily change their nature, and which themselves are indiffusible, but which, when existing normally with the proteins, render both capable of exerting feeble osmotic pressure. This is interesting to us chiefly because it shows the utter difficulty of setting up experimentally conditions similar to those in the mouth with any degree of surety of reproduction.

his theories for a time as proved—his belief in a course of operation of the features of the process of decay which entirely harmonizes with the theory under discussion, and these are the most rational of his papers, as it is possible to gain from them the clearest picture of an experienced practitioner's idea of dental caries, separate from his unproved theories. To Kirk,[8] writing in the DENTAL COSMOS for January 1914, page 11, it was apparent that it was necessary to consider the etiology of caries "from a different angle of view from that which has characterized our mental attitude ever since the disease has been seriously studied at all." That the influence of secretions of the ductless glands has a profound effect upon the body metabolism is synonymous with the statement that they exert also a subtle influence upon the electrolytic qualities of the saliva—which, however changeful, are ever present—and possibly an effect upon the teeth as electrodes.

In writing at that time Dr. Kirk appeared to find a reasonable position, and gave due credit for the valuable work hitherto done to discover causative factors, and his article practically summarized the ideas of value that had been put forth at that time. That much definite knowledge has been accumulated as to mouth conditions is a necessary point to bear in mind in the formulation of any explanation dependent upon new data.

There are no important difficulties in the advancement of the electrobiolytic theory of dental caries. Undoubtedly chemic and biochemic phenomena are advanced by the electrolytic changes that are constant in the presence of caries. It appears probable that in the light of peculiar conditions affecting the quality of the electrolyte, chemical factors will modify the operation of electrolytic changes in the mouth.

POSSIBLE COURSE OF THE PROCESS OF ELECTROLYSIS IN THE MOUTH.

The ultimate definition of the status of the tooth structures in setting up different potentials, the location of the polar charges, and the profound effect of the constituency as well as the reaction of the saliva on the presence and strength of electrolytic action, are points to be worked out. The early work of Jenner and of Pasteur is none the less logical on account of the exceedingly complex occupations and researches that have grown out of the older clinical work. The relation of the presence of various types of caries to further progress of electrolysis and the tendencies toward polarization,[9] and the destruction of the poles as such through loss of their mineral content and the remainder of the end-products[10] of the process are under consideration.

Finally, among modifying factors study is being made of the influence of foreign bodies in the mouth—fillings, etc.—and of the possibilities of the introduction of correcting and nullifying measures[11] for the attenuation and oblit-

[8] See footnote 2.

[9] The presence of a solution of one of its salts about the location of an electrode makes it non-polarizable, and it will be seen that this means of upsetting electrolysis in the mouth must be discarded, and the feature regarded as one disposing the scene to greater activity.

[10] The work being done on the actual end-products of the process of electrolysis in the mouth, and the nature of the matrix of cavity decay as refuse from the process, promises to be interesting in its results.

[11] In connection with this theme Dr. Kirk referred the writer to the related literature "growing out of the warfare which was waged by the so-called New-departurists in the late seventies of the nineteenth century, the chief exponent of the electrolytic theory at that time being Dr. S. B. Palmer of Syracuse," and directed attention "to the Transactions of the Odontological Society of Pennsylvania for 1879 (published in the DENTAL COSMOS for 1879, page 623, and 1883, page 86), containing material by Bonwill, Register, Essig, Jack, and others."

These pages are of great interest in that they indicate the probable value of clinical observation in the institution of a state which we may term insulation, and show the importance of consideration of all chance data for the possible determination of measures which will affect the process of electrolytic decomposition in the mouth.

Dr. Kirk's communication is quoted fur-

eration of differences of electrical potential.

It is gratifying that the evidence in connection with this theory bears out the work of those advocates of the preparation of all tooth surfaces to a condition of irreproachable smoothness. This, it will be noted, is the condition of an inefficient electrode, and as we may never be able to obtain under the complex mouth conditions a state of polarization, it appears probable that this measure will for all time constitute our sole preparation of the teeth to simulate a state of electrolytic inefficiency and consequent inactivity as electrodes.

The opportunities to explain in a reasonable manner all the known features of our clinical work dealing with caries and our accumulated knowledge of mouth conditions in their bearing upon the process of caries in alignment with

---

ther: "These references deal especially with the galvanic relations of gold or amalgam when in contact as fillings in the same or adjoining teeth. You may be interested in two personal observations relating to that matter. About 1882 or '83 I had occasion to examine the mouth of a woman who had applied to me for dental service, and I found very extensive amalgam fillings inserted on the approximal surfaces of her upper first and second molars in contact with large occlusal fillings of gold in the same teeth. The approximal cavities had been originally filled with gold, but recurrent decay had loosened the approximal fillings, which had been replaced by amalgam without disturbing the gold fillings in the occlusal surfaces. Extensive recession of the gum from gingival disease had occurred, and the amalgam reached almost to the bifurcation of the roots of the teeth. The margins were, however, absolutely perfect, and the fillings quite black. Nevertheless the entire operation was manifestly preserving the teeth, as the patient told me that the fillings had been inserted by the late Prof. James E. Garretson some fifteen years previously.

"As the combination of gold and amalgam in the same tooth in that way was at that time under serious condemnation by the best operators, I was struck by the success which had attended the use of amalgam and gold in this particular case, and was led thereafter to adopt the same method in similar cases, with equally good results. An interesting point in regard to the matter is that in all cases where the amalgam seemed to completely arrest recurrent decay its exposed surface quickly became quite black, so that the amalgam filling looked like an inlay of lignite or some other similar black material. In a few instances where the surface of the amalgam remained bright it became rapidly eroded, a condition which I attributed to the difference in salivary composition, the actual difference being that the saliva in these latter cases was found to be acid.

"The other case occurred in the practice of the late Dr. Isaac S. Fogg, with whom I was for a number of years associated as a partner. He had as a patient a lady of refined tastes and large wealth who when she first came to him as a patient had a lower left molar filled on its occlusal surface with amalgam, which had turned black. This filling was the only one in that particular tooth. The rest of her teeth so far as they needed it were filled with gold. On several occasions this patient objected strenuously to the rather unsightly appearance of the dark amalgam surface, and requested Dr. Fogg to remove the amalgam and replace it by a gold filling. This he was reluctant to do, because the amalgam, which was well finished, was perfectly preserving the tooth. However, the patient still insisting, he acceded to her request, but compromised by cutting out about half of the amalgam filling, making a cavity of sufficient depth to hold a superimposed layer of gold. The operation was completed and thus consisted of a composite filling the under portion of which was amalgam and the exposed portion gold. The operation was finished in the late afternoon. The next morning the patient returned with a history of intolerable pain of a peculiar character, which from her description evidently arose from an irritated pulp from galvanic shock. I was called in consultation by my partner, and mainly for the purpose of testing the galvanic theory I suggested that a small hole be drilled through the center of the gold filling, the hole to be filled with amalgam so as to bring the two metals to the surface exposed to the action of the mouth fluids, my thought being that I would thus be able to switch the galvanic circuit from the pulp and confine it to the two metals. The procedure was carried out, and the moment that contact with the oral fluids was established with the amalgam through the hole drilled through the gold filling as above indicated, the pain ceased and did not return again."

this theory are numberless,[12] and many must be left to further meditation and resolution to work out accurately those questions which the operation of these principles will bring to the minds of all observers.

If we consider a schematic case in which are existent all the hitherto supposed predisposing causes of caries, the presence of acids, bacterial growth, colloidal deposits (gelatinous plaques), mycoidal fermentation, various forms of systemic disease and altered body metabolism, the peculiar deviations in the functioning of the ductless glands, or any of the perplexing forms of caries where there is no apparent cause aside from that under chief consideration, and where the mouth is kept scrupulously clean by every known artificial measure —that case will show the presence of differences of electrical potential; and whether that alone is the causative agent (and its strength in some observed cases indicates that it well may be), or merely the correlative of other factors, it is not the task of a moment to discover.

It is not difficult to recognize that the definite laws of the behavior of electrical phenomena which are in operation in the mouth may offer a groundwork for investigation of those forces which, beset on every hand by modifiers which approach in complexity the secret of life itself, split up the normal tissues of the mouth.

It becomes necessary to investigate every chance means of elimination of an influence which, though at nearly all times bordering upon the infinitesimal, becomes by its cumulative effect a menace to the preservation of the teeth; and in the solution of its elimination is the hope of salvage of the teeth. The means will be simple, and the recognition of a means to alter this influence will bring benefit to the individual not so much as to the race.

387 Main st.

[12] It would appear that the enamel, having 97 per cent. of earthy material, on account of its greater compactness offers greater resistance to electrolytic forces than the dentin, with 72 per cent. earthy material.

Logical Asepsis in Dental Practice.

By J. R. CALLAHAN, D.D.S., Cincinnati, Ohio.

(Read before the Dental Society of the State of New York, at its annual meeting, Rochester, May 10–12, 1917.)

"THE public advocacy of advanced ideas demands endless reiteration. The repetition must be so continuous, if possible varied, and long-maintained, that at last by the action of certain psychological sequences people begin to suppose that these ideas and arguments are their own, and that the advocate is a platitudinarian. It is only when, having long thought him mad, they think him dull, that he may congratulate himself on having done his work."(1)

I would be surprised if any member of this society should raise his voice in condemnation of the practice of logical asepsis in relation to any and every operation within the oral cavity; still I should meet with a surprise—no, two!—if 50 per cent. of those present do go through with a root-canal treatment and filling, maintaining a thorough asepsis, at the same time preserving the integrity of the surrounding vital tissues, with the methods and appliances now in use in the majority of offices.

I am not trying to hold my profession up to ridicule, for the dentist is as conscientious, capable, and thorough in his sterilization and general asepsis as other sections of medicine, excepting surgery; surgical practice stands upon asepsis as upon a rock, and it is for us to "observe, reflect, and record."

I do not call to mind a single operation in daily practice that does not call for surgical cleanliness. At the same time I remember the scores of offices that I have visited; and when I examine the various office appliances and equipments that are placed on exhibition by dental supply dealers—and above all, when I remove the veil from my own eyes, or have it removed through the experience and observations of two years' service in and about the surgical pavilion of a large hospital, and study my own office and practice—I have to admit that we have not kept pace with the growth and development of aseptic surgery.

S. Mark White, M.D., University of Minnesota, in a paper read during the Panama-Pacific Congress in San Francisco, said: "For the most part dental asepsis has not yet reached the perfection of the surgical operating rooms; it becomes apparent that the methods used are such as to invite rather than prevent infection. This is a question, however, for the dentist."

Again does another branch of the medical profession give us a truth that cannot be passed over lightly. Practically the same statement has been made over and over again by dentists, but do we as a profession make a whole-hearted effort to meet the situation? Suppose we examine our equipment and technique. With your consent let us analyze my own office and methods—for I myself have come up through all the phases of dental practice since 1877, and I have had, and still have, many things to learn.

In my own operating room the varnished walls are washed down once every week; the furniture is kept comparatively clean and free from dust; the linoleum floor is mopped every morning; no uphol-

stery on chair; on the floor will be noticed a rug (Fig. 1), and at the windows two heavy curtains.

BACTERIOLOGIC TESTS OF OFFICE CONDITIONS.

To test conditions, a culture-plate was placed on the cabinet and exposed for ten minutes, then sealed and placed in an incubator. After 24 hours in the incubator, a smear showed the presence of a surprisingly large number (Fig. 2) of staphylococci. A further study of this culture-plate shows the presence of other micro-organisms; but just now we are interested merely in the presence of the pathogenic germs, or micro-organisms that we know may become disease-producing.

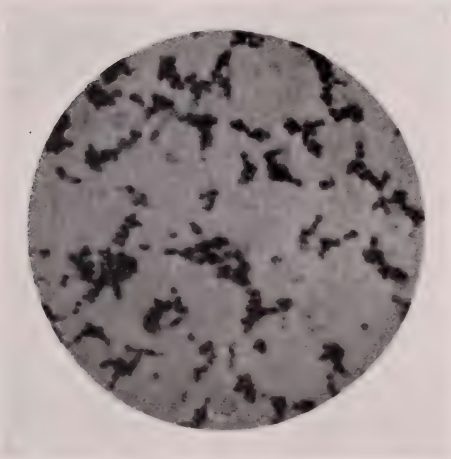
What is wrong with these operating rooms from an aseptic standpoint? We come abruptly to the only point that we are now interested in: More dust gets into this room than should; the air of Cincinnati is dust-laden; there is the sweeping and moving about of the rugs, the shaking of the window curtains, the cleaning and dusting of the adjoining reception room (the books in the library being wonderful dust-catchers). If the rugs and curtains are removed, I believe this operating room can be kept sufficiently clean and free from dust to make it a reasonably safe dental operating room; notwithstanding this belief, the room is to be enlarged and remodeled.

Aseptic surgery is an impossibility unless the hands of the operator are surgically clean. To make the skin

Fig. 1.

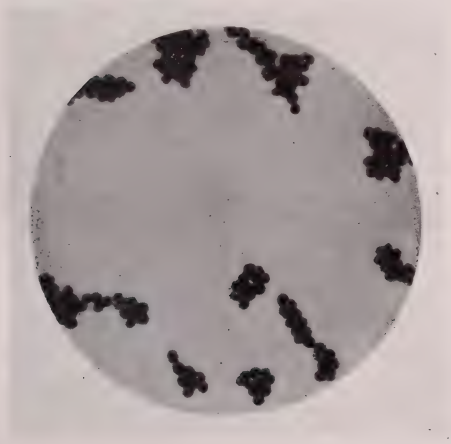
absolutely free of micro-organisms by scrubbing is said to be an impossibility, therefore the surgeon makes use of

Fig. 2.



thin rubber gloves. I think the time will come when the dentist will make more frequent use of gloves for his own protection as well as that of the patient.

Fig. 4.



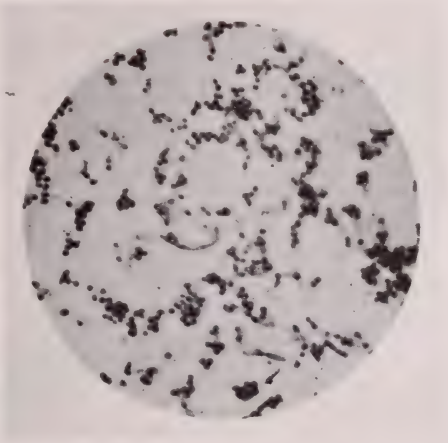
The following experiment may be of interest at this point.

Just before washing the hands the finger-tips were placed in contact with agar in a Petri dish; the slide shows, after 24 hours' incubation, staphylococci in abundance. (Fig. 3.) We will not stop to search for a stray streptococcus

Fig. 3.

or pneumococcus or any other stranger that might be on the slide. Then the hands were scrubbed with soap and brush in running hot water; again finger-prints

Fig. 5.



were made in agar, and a smear shows a few big fat staphylococci. (Fig. 4.) The large size indicates a low virulence according to some authorities. The hands were again thoroughly sterilized,

and after working for a patient for fifteen minutes, finger-prints were made in agar; after 24 hours' incubation at 37½° C. the smear showed a mixed culture of staphylococcus, colon bacillus, hay bacillus, etc. (Fig. 5.)

These simple and by no means thoroughly worked-out experiments show us that the rational thing to do is to get the hands clean and keep them clean, by thorough scrubbing for each patient, then rinse the hands at frequent intervals in some reliable non-irritating antiseptic —my choice being lysol or Dakin's fluid —or cover the hands with tincture of green soap, which soon dries leaving an invisible smear of soap over the hands that covers the sweat-glands, the hair follicles, and the epithelial scales, for a short time at least.

What appliances have we that should be sterilized, and how shall we sterilize them? Rubber dam is sterilized when in position on the teeth by washing the field of operation with alcohol (70 per cent.) or tincture of iodin. The chip-blower or hot-air pipe should be flamed; handpieces should be boiled in a green soap solution occasionally. For purposes of sterilization we may separate our instruments into two divisions:

First Division.

Clamps, Forceps, Broaches, Sprays, Hypodermic syringes, Mirrors, All cutting instruments, Pluggers.	These can be sterilized by boiling in water and soda in any receptacle that will hold water and stand sufficient heat: then dried on napkin.

Second Division.

Threads, Cotton pellets, Napkins, gauze, etc., Cotton on broaches, Absorbent paper points, Cotton shreds for packing in roots, Gutta-percha points, Pads, cottonoid, etc.	These should be sterilized in flowing steam and dried in hot air.

If it be true that the grade of service a dentist renders can be judged by the instruments or appliances he uses for a given purpose, then the sterilizers for instruments and materials that are used in daily practice in most of the dental offices of this country indicate a low grade of service, so far as asepsis goes. We are not referring to any other feature of practice, simply to *asepsis* in all that the word means to any and every branch of surgery.

When the manufacturers realized that there was to be a demand for sterilizers, they began to put on the market sterilizers that would sell—not apparatus that would meet the requirements; and the majority of dentists permitted talkative salesmen to deceive them in a manner that would be amusing if it were not so serious. As a result, wall cabinets appeared in many offices, the glass doors of which bear the legend, in large gilt letters, STERILIZER. So loud and so positive is the statement that one is deeply impressed. How could a micro-organism dare remain in an office with such a menace staring him in the face! An examination of the interior of the cabinet, however, puts a microbe at ease. While the cabinet is new, a little formalin in some form is kept in the cabinet. Dependence is placed upon formaldehyd—which, as everybody knows, is a germicide of the first class, but it is a difficult matter to confine gas; it leaks out while the case is closed, and when the doors are open it *flies* out. If instruments are boiled, then dried on sterile towels before being placed in the gilt-lettered cabinet; if the gilt-lettered door is gas-tight, and there be formaldehyd in sufficient quantity within the gilded case, then the instruments will remain sterile so long as the gilt letters and the gas hold out.

CHARACTER AND DEGREE OF HEAT NECESSARY FOR STERILIZING INSTRUMENTS.

It should be remembered in this connection that "Formaldehyd is an effective germicide only in the presence of moisture. Room or chamber humidity should not be lower than 60 per cent., temperature not less than 16° C. Dry heat is much less effective as a germicide than steam. In a dry atmosphere temperature ranging from 140° C. to 180° C. must be employed to insure sterilization.

If steam under pressure be used, as in the autoclave, exposure for fifteen minutes to a temperature of 125° C. is sufficient to kill all known microbes. The difference between moist and dry heat doubtless depends upon the fact that the chemical or physical changes that cause coagulation of protein or the death of protoplasm take place, like such actions generally, more readily in the presence of water."(2) With regard to the staphylococcus aureus, Goadby ("Mycology of the Mouth") says the thermal death-point of this organism is between 56° and 58° C. for ten minutes' exposure, when in a moist condition; when dry, however, a temperature of 90° to 100° C., acting for the same length of time, is required.

Fig. 6.

Fig. 7.

Is it rational to claim that every instrument in the operating room should be sterilized? I do not see how we can in any reasonable way avoid doing so. Our hands and our instruments are in contact with infected tissues every day. I am not forgetting the difference between invasion and infection.

Two or three cases will illustrate what I have in mind.

Case I. I show this case (Fig. 6) because it represents such a small infected area. Miss W., a case of arthritis and general nervous breakdown. The tooth was extracted, and a culture taken from the socket under proper sterile conditions shows the presence of an abundance of streptococcus viridans. (Fig. 7.) What should be done with every instrument

Fig. 8.

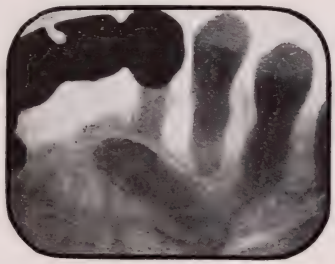


Fig. 9.

that was used? Should these instruments be placed in the case after an indifferent rubbing or washing?

Case II. (See Fig. 8.) After the removal of the bridge and the impacted cuspid, streptococcus pyogenes, also S.

Fig. 10.

longus, were found in abundance. (Fig. 9.) Should these instruments be sterilized?

Case III. (See Fig. 10.) A case of arthritis. This root has been filled with a dollar per bottle root-filling compound, warranted to prevent infection or reinfection in any root for a lifetime. A culture was taken from a broach that was in use while removing this popular and widely advertised root "stuffing" (Fig. 11), and shows the presence of almost every species of bacteria known to science. If any instrument used in this case, up to the time of filling the canal, should be laid on the cabinet or desk, the whole office would be liable to infection. What is the logical thing to do with these instruments?

Fig. 11.

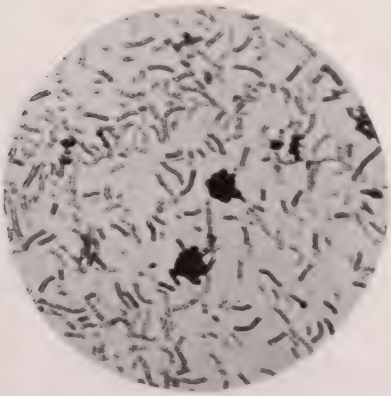
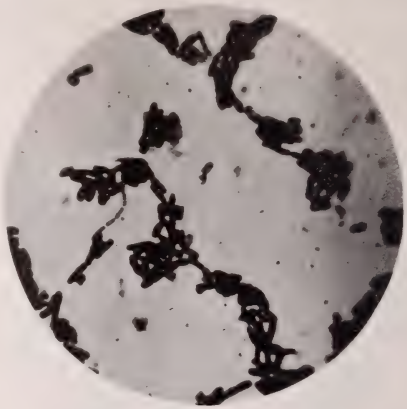


Fig. 12.

Fig. 13.



CLASSIFICATION OF INSTRUMENTS FOR STERILIZATION.

I have given above in the first division the list of instruments that could be sterilized in a most satisfactory manner by boiling in water. No sterilizer is really necessary for these other than a metal pan over a fire; some simply to be held in the alcohol flame. The second

division, however, requires something different; they should be thoroughly sterilized and should come to the chair perfectly dry and cool, without having been touched or exposed to the chance of infection by being brought in contact with napkins taken from a dusty drawer.

Japanese paper canal points as they come to us in the sealed package are sterile, but the package has to be opened, and they are mussed to some extent before being used, some being kept for some time before being required for use.

A few of these points were passed quickly from the box to a Petri dish and then incubated. (Figs. 12 and 13.)

Fig. 14.

Fig. 15.

These showed what are commonly called hay bacilli or B. subtilis; colon bacilli are also plainly seen in the center. The logical thing to do is to sterilize every point just before using.

This picture (Fig. 14) illustrates the most asinine habit that any group of specialists ever permitted themselves to become wedded to, namely, the twisting of cotton on broaches with the bare fingers, then thrusting that infected cotton into a deep canal from which they are trying to remove every trace of infected, or liable to be infected, material. If the cotton is saturated with a powerful germicide and you want a powerful germicide in the canal, all well and good; but suppose a mild antiseptic is being used—or, more to the point, suppose the cotton is being used to absorb blood or moisture—would it not be far more logical to sterilize the cotton, without using drugs with it, *after twisting* the cotton on the broach?

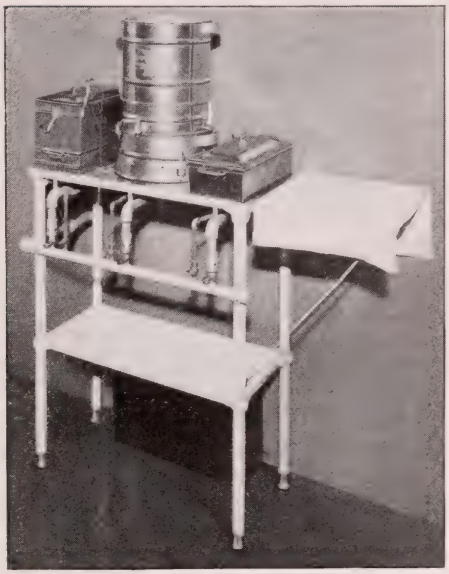
Fig. 14 shows cotton twisted with clean hands on sterile wood points (steel broaches rust in incubators), then placed on agar media in a Petri dish, and after 24 hours' incubation produced a growth of hay bacillus and colon bacillus in streptococcus form. (Fig. 15.)

We have seen that there are several ways in which to sterilize the various instruments, but the one best method for sterilizing any and all dental appliances is flowing steam, combined with hot air for drying. The steel instruments, the paper points, the gutta-percha points, the napkins, everything to be sterilized, can be taken care of in the best and most thorough manner known, all at one time, in the same sterilizer.

Fig. 16 shows two sterilizers, and a still for distilling water. The small sterilizer is simply a boiler that is used for steel instruments. We do not really need the boiler, because the steam-chest or the Rochester combination sterilizer does everything, and does it better than any appliance that has come to my no-

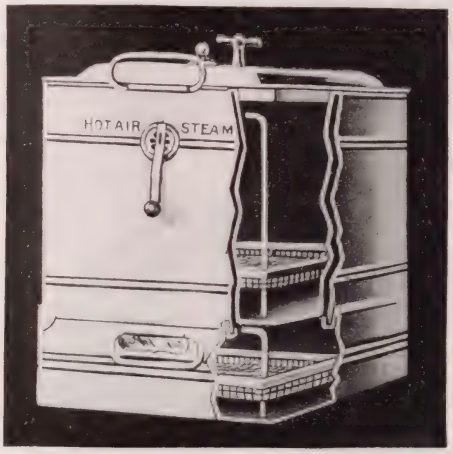
tice. Having worn out three electrical heaters, I am prepared to say that a gas heater is much more satisfactory, especially if you have a pilot light as shown in the illustration. The pilot is lighted the first thing in the morning, is always ready, and keeps the water warm. By

Fig. 16.



turning on the gas in the main burner, steam is produced in a very few minutes. The plan of the boiler is shown in Fig. 17. The water being in the lower chamber, the steam passes up around and into the main chamber when desired. After having steamed the contents of the upper basket, a turn of the lever near the top allows the steam to pass out without entering the sterilizing chamber where the contents, gauze, cotton, etc., become dry in a few minutes. This outfit is only about half as large as it should be. The inside measurement is 7 x 14 inches. This sterilizer is to be found in all surgical and many dental supply houses, and as a rule they try to sell the smaller size, which I have found to be too small. If I can prevail upon you to avoid the im-

Fig. 17.



possible little toy sterilizers so popular today, logical asepsis in dental practice will have made a step forward.

BIBLIOGRAPHY.

1. Saleeby. "Surgery and Society."
2. Jordan. "Principles of Bacteriology."
3. Marshall. "Microbiology."

Sixth and Main sts.

[See also *Discussion*, as reported under "Proceedings of Societies," this issue.]

Movement of Teeth Predetermined by Engineering Instruments:

Appliances Designed in Accordance with Analytical Mechanics.

By FREDERICK LESTER STANTON, D.D.S., New York, N. Y.

(Read before the annual meeting of the Eastern Association of Graduates of the Angle School of Orthodontia, New York, May 7 and 8, 1917.)

[Copyright 1918.]

"What a man feels intensely, he struggles to speak out of him, to see represented before him in visual shape."

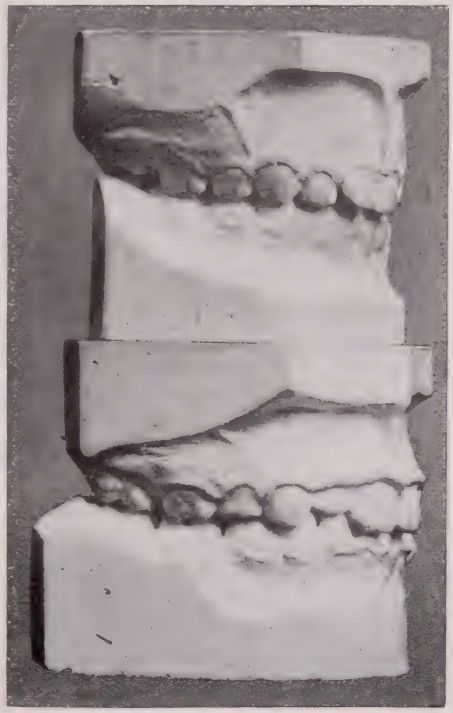
"We can see with the perception of truth is joined the desire that it thus shall prevail." —CARLYLE.

FROM the fall of 1914 to the early spring of 1915, the author spent most of his working hours in making maps of dentures. Models of malocclusion were mapped by means of dividers; bisecting lines were made to locate the various points of interest. It seemed to the author at that time that the mapping process would solve many of the mooted questions of orthodontia. Orthodontic specialists were invited to his office to inspect the work, but little or no interest was shown. The writer, finding no way to map by hand the relative heights of the teeth, sought advice. The *Scientific American* offices and various instrument houses were visited. Finally a mechanical engineer, Mr. Hanau, said he could construct an instrument to record the relative heights of the teeth. This instrument was so designed as to make the maps previously drawn by hand, as well as record the relative heights of the teeth.

Mr. Hanau became interested in this work and the data I had collected from the examination of skulls in the National Museum, and said he could find a mathematical formula for arch predetermination.

The surveying apparatus was shown at the annual meeting of the Connecticut State Dental Association in 1915,

FIG. 1.



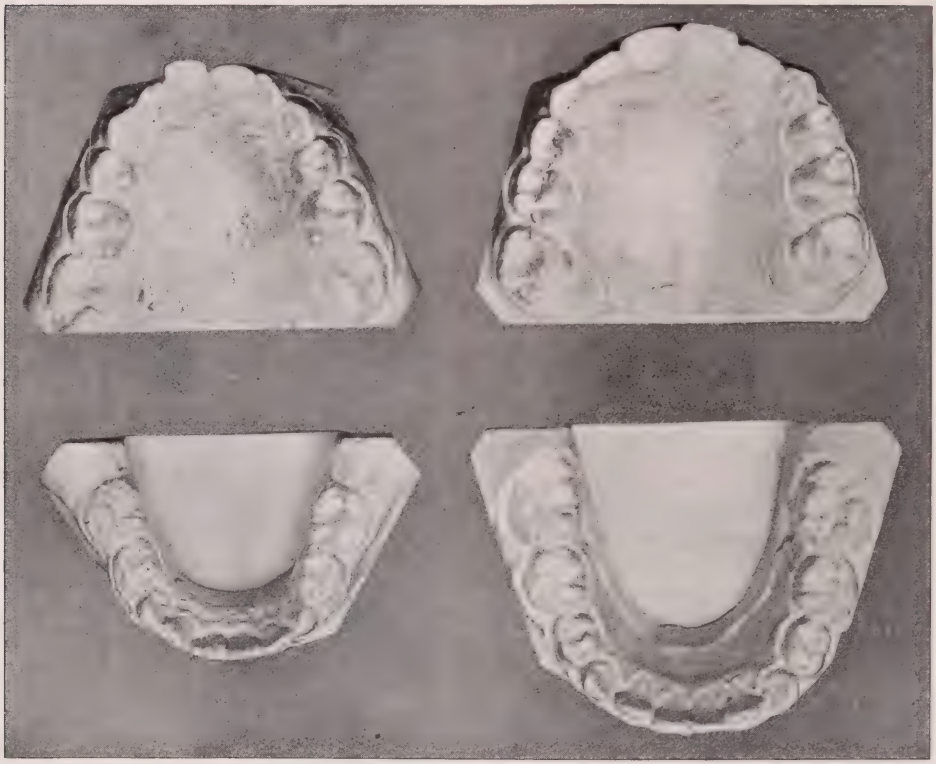
Upper model, child of six. Lower model, same case one year later. Plan of treatment made by an engineer. Appliance designed by an engineer and operated by a dentist.

and a summary of the investigation was given before this society in May 1915, but scarcely any discussion was evoked.

A paper on this subject was sent to the Panama-Pacific Dental Congress held in San Francisco, Cal., September 1915, the major part of which was written by Mr. Hanau, and described his method of predetermining the occlusal arch. This method of trial on the drawing-board consists of laying off on various curves—parabolas, ellipses, etc.—the mesio-distal diameters of the teeth until the true occlusal arch for a given case is found. The paper referred to remains unpublished, as the proceedings of the Congress have not appeared. Although *Dental Items of Interest* advertised this paper as one that would appear in that journal, it was finally rejected by the editor.

Toward the close of 1915 the possibility of finding a formula for occlusion seemed to the writer so remote, and the estimated amount of money necessary for the investigation so large, that he decided to consult the Engineering department of Columbia University to see if the investigation he had undertaken was proceeding along the best lines.

Fig. 2.



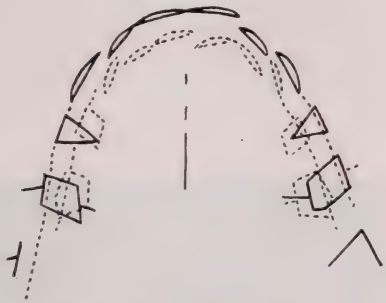
Occlusal view of models shown in Fig. 1.

It was found that at this period—after the maps had been made and the tooth widths measured—it would take the engineer more than twenty hours to complete the book of plans for a case, and that some cases would require an expenditure of as much as $150 for the engineer's time.

After a short consultation with Professor Finch of Columbia University, he said he saw no great difficulty in the problem, and suggested Gilbert D. Fish,

C.E., to assist me in the investigation. You can imagine my surprise when Mr.

Fig. 3.

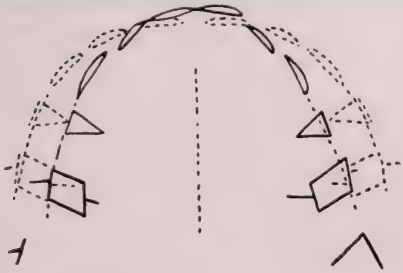


Map of malocclusion case shown in Figs. 1 and 2. Uppers, solid lines; lowers, dotted lines. This map was made with the dental surveying apparatus.

Fig. 4.

Map of occlusion for Fig. 3. Made by an engineer, using the arch-determining instrument, the occlusograph.

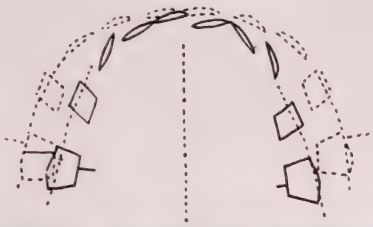
Fig. 5.



Map showing the relative movements necessary to change the upper teeth from malocclusion to occlusion.

Fish announced that he could give me a working solution of arch predetermination within two weeks. After a consultation, during which I described to him the conditions of normal occlusion,

Fig. 6.



Map showing the relative movements necessary to change the lower teeth from malocclusion to occlusion.

Fig. 7.

Model showing malocclusion case treated by a general dentist, using plans designed by engineer.

Fig. 8.

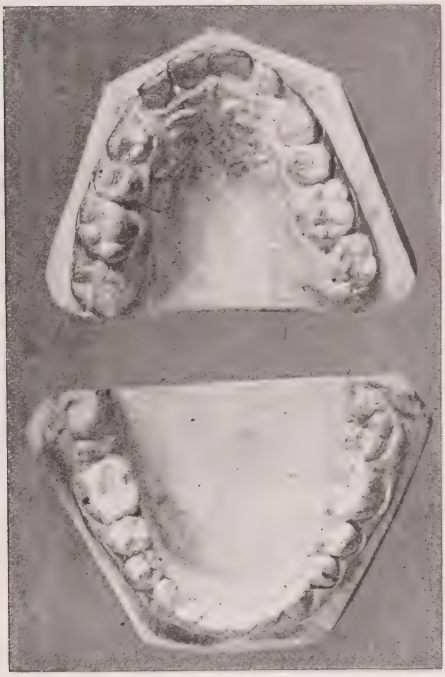
Study model showing progress made by general dentist.

I selected for trial the model which had given the greatest amount of trouble in

selecting the proper occlusal arch by the use of mathematical curves.

At the end of two weeks Mr. Fish returned with the correct arch form predetermined, *i.e.* it was like the one so laboriously formed by the method of trial of Mr. Hanau. Mr. Fish also devised a mathematical formula and method of arch predetermination which

Fig. 9.

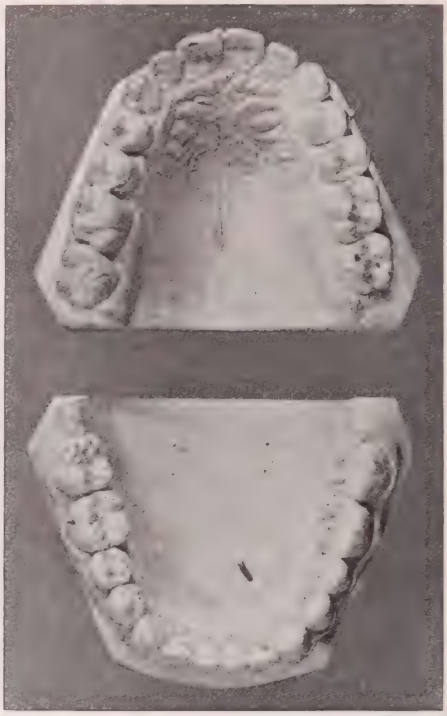


Occlusal view of case shown in Fig. 7.

was incorporated in an original paper. This paper was sent to the editor of the Dental Cosmos, who finally returned it as not available for publication. Mr. Fish stated that arch predetermination was not a mathematical problem but a mechanical one, and he presented me with the arch-determining instrument, the occlusograph.

I shall not take your time in describing this method, as you may better read it in an article to be published shortly in the *International Journal of Orthodontia,* by Mr. Fish, but shall show you models of practical cases, the book of plans showing the predetermined movements, the progress surveys showing the relative movements accomplished, and the appliances used. I shall not attempt to describe the mechanical principles involved in the selection of arch forms, as that phase of the subject was ably pre-

Fig. 10.



Occlusal view of models shown in Fig. 8.

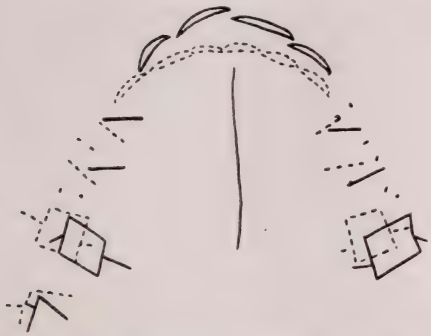
sented to you by Mr. Fish in his paper yesterday.*

In addition to the foregoing I have decided to speak about arch predetermination, especially after the paper of yesterday by Dr. Hellman, and so I have incorporated a few slides.

You remember it was said yesterday by Dr. Hellman that the teeth varied in

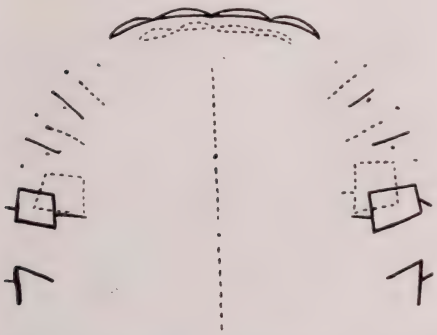
* [See "Some Engineering Principles of Possible Interest to Orthodontists," by Gilbert D. Fish, C.E., in the September issue of the Dental Cosmos, page 881.—Ed.]

Fig. 11.



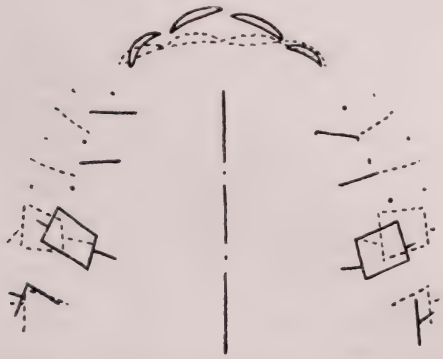
Map of malocclusion made by surveying models in Fig. 7.

Fig. 12.



Map of occlusion for teeth shown in Figs. 7 and 11.

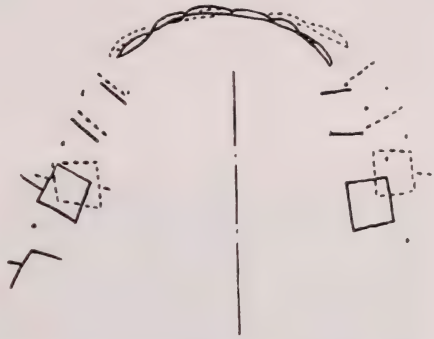
Fig. 13.



Relative movements required on upper jaw to change the teeth from positions shown in Fig. 11 to position of occlusion shown in Fig. 12.

size, although large teeth might be found in narrow arches. We have been endeavoring to tell you in the short papers we have written on this subject that the *whole arch depends on the interrelation of the sizes of all the teeth, all*

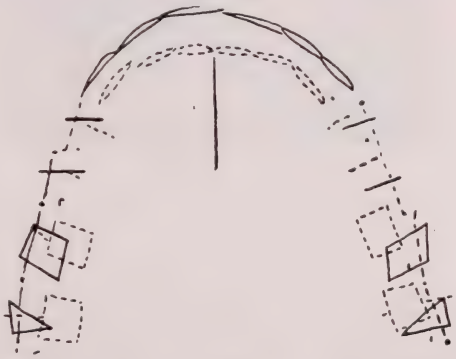
Fig. 14.



Relative movements required on the lower jaw to change the teeth from positions shown in Fig. 11 to positions of occlusion shown in Fig. 12.

dimensions of the teeth, and all parts and forms of them. If you should have in two cases the same teeth, the only exceptions being in the two incisors, and they should vary only two millimeters,

Fig. 15.



Progress survey of models in Figs. 8 and 10. Compare this map with the original malocclusion, Fig. 11, and the proposed occlusion, Fig. 12.

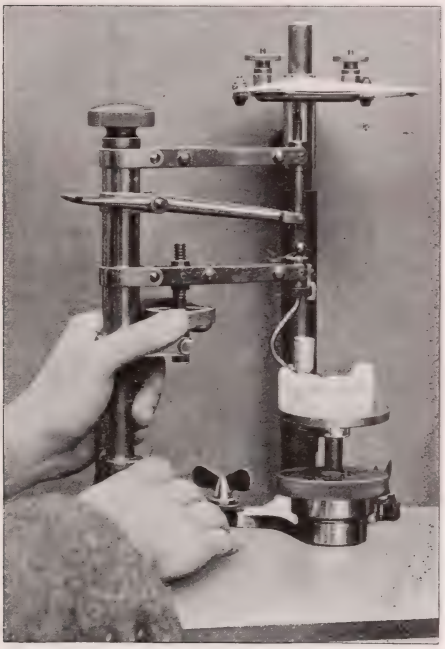
the entire arch would vary. The smallest change in any tooth produces a material change in the arch form.

The common picture of malocclusion is a needed expansion of the lateral units.

We join the bicuspids with a yoke, and that unit must be moved from malocclusion to its predetermined occlusion.

The movement of the anterior portion of the arch is considered separately. In all cases of malocclusion the common picture is that both upper and lower cuspids need to be moved in this way. The distal corner travels much farther than the mesial.

Fig. 16.



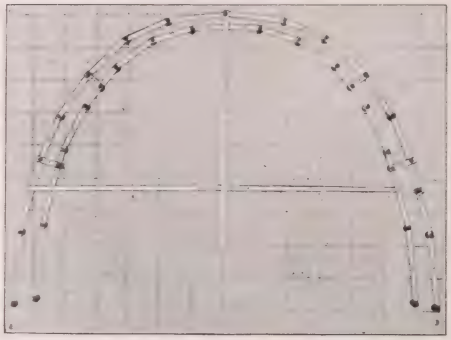
The dental surveying apparatus. An engineering device used to orthographically project the denture.

I believe all the mistakes made in my orthodontic treatment in the past have been due to a lack of expansion in the bicuspid region, and a pulling on the incisors. I believe the incisors should not be banded except in rare cases, and their treatment should not be attempted until the form and dimensions of the arch have been obtained by moving the bicuspids and molars of both jaws to their true positions.

In the case of a mixed denture we set the instrument with the deciduous teeth in occlusion, that is, the cuspid and two molars. We then insert a link the size of the permanent lower central. Knowing that the lower lateral has a quite constant relation to the lower central (it is about half a millimeter larger) we insert a link for the permanent lower lateral. After measuring many sets of teeth we found the ratio, between the combined widths of the four upper incisors and the combined widths of the four lower incisors and one cuspid, to vary from 100 to 110.

We now manipulate our instrument so as to keep occlusion of the deciduous teeth—molars and cuspids—and open a gap in the upper incisal region to permit four teeth to erupt whose combined diameters will give with the lower five teeth a ratio of 105—an average ratio. Having made this tentative treatment, we wait until all the permanent teeth are erupted, and then a revision of the arch is made as the permanent teeth erupt.

Fig. 17.



The occlusograph in this position shows the occlusion of the case represented.

It seems better to put this tentative treatment on paper and examine it than to attempt to estimate by the eye and leave the mental diagnosis unrecorded. We can show the predetermined movements, and see how near they come to the plan. If they do come near the plan, then it would seem to be a rational treatment to use.

CONCLUSIONS.

(1) As long as orthodontic procedure consists in moving teeth by means of appliances, a knowledge of analytical mechanics is essential for the intelligent designing of an appliance.

(2) As long as orthodontia has for its goal normal occlusion, the operator should know the form and dimensions of the occlusal arch of each case before beginning treatment.

(3) If any other goal than normal occlusion is the aim of an orthodontist, *that* arrangement of the teeth can and should be mapped out in advance of treatment, and the relative movements of all teeth predetermined.

(4) Until the etiology of malocclusion is known and its prevention is accomplished, the vast bulk of orthodontia must be done *for the masses by the general dentist.*

(5) Safe and sane orthodontia can be accomplished by the general practitioner by means of predetermined movements combined with appliances selected with due regard to analytical mechanics.

(6) If the above conclusions are correct orthodontia will be brought within the reach of the masses; the general practitioner will be rendering a good service, and the orthodontic specialist will find his field enlarged, as many more will demand the services of the specialist.

28 West 39th st.

[See also *Discussion,* as reported under "Proceedings of Societies," this issue.]

Orthodontic Treatment of Advanced Cases, and Patients Coming from a Distance.

By J. A. CAMERON HOGGAN, D.D.S., L.D.S., Richmond, Va.

(Read before the Eastern Association of Graduates of the Angle School of Orthodontia, New York, N. Y., May 7, 1917.)

Mr. Chairman and Gentlemen:

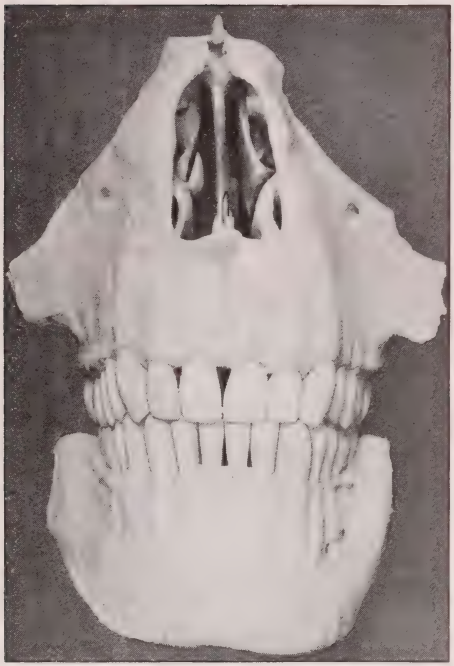
In this lecture, or presentation of slides, I will show you a model, and the means of contructing it, with which I hope to be able to get more than a simple register of the present position of the teeth, at the commencement of orthodontic treatment.

It has seemed to me that if it were possible to get a model that performed some other function than merely to register the malocclusion, a model that would extend the limitations of plaster of Paris, a model with a greater range of usefulness, a model that would give some knowledge of the teeth at any period of the treatment, then I should be bringing the science of orthodontia a step nearer the desired goal. Further, I thought it might be possible to construct an appliance upon that model, by means of which someone other than the man who constructed the appliance could move the teeth. In the discussion this morning of that part of the President's address which refers to the possibility of having a dentist treat a case, or assist in the treatment, at some distance from an orthodontist, there arose one of the points that I wish to bring out in the use of this model.

DESCRIPTION OF ILLUSTRATIONS.

Fig. 1 is simply an illustration of a method of producing occlusion of teeth in an artificial way as I attempted to do

FIG. 1.



A

B

FIG. 2.

FIG. 3.

FIG. 4.

FIG. 5.

some years ago. It is merely a study of occlusion, and the bones of the face concerned in breathing. The whole model can be disarticulated, and I display it here to trace with you the influence upon

Fig. 6.

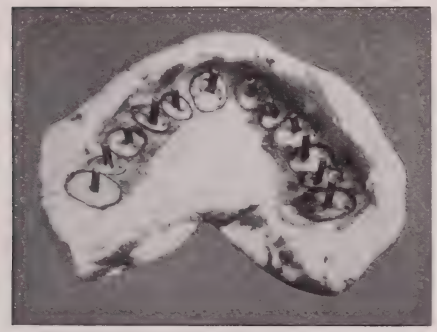


Fig. 7.

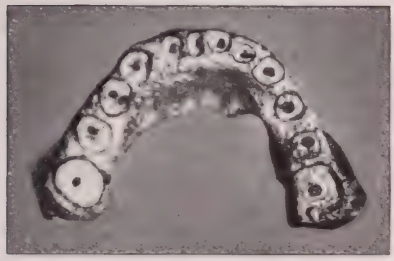


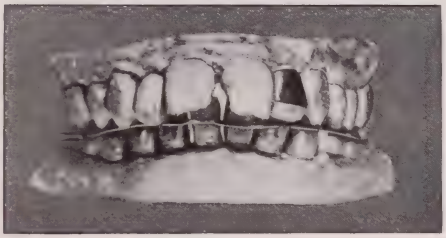
Fig. 8.

a mind working and playing with occlusion over a period of ten years.

In the construction of this model of the teeth in metal, I aimed at getting an individual wax impression of each tooth, and to do it I first took an impression in the usual way with plaster of Paris, and with the impression in a more or less moist condition I dusted over it talcum powder with a camel's-hair brush, and forced softened inlay wax into each individual impression of the teeth.

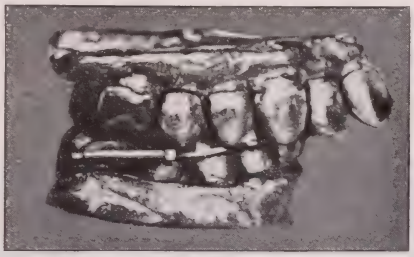
Fig. 2. The illustration on the right shows the wax model after it is removed

Fig. 9.



from the tooth. That on the left shows the tooth after the wax had been carved away from the unexposed portion of the crown. My object is to get a wax model of the complete crown. The wax is not necessarily an exact duplicate of the unexposed portion of the tooth, but there is so little to carve that the portion which is carved and represents the complete

Fig. 10.



crown will be so nearly accurate that it serves the purpose, since it is below the contact point.

Fig. 3 is a picture of all the crowns of the teeth carved, cut off, and replaced in the impression.

Fig. 4 shows the wax models in place in the impression, attached by means of plaster of Paris on a camel's-hair brush, placed about the necks of the wax models

which have been carved. The object is to add to the impression that portion which has been added to the wax crown.

Fig. 11.

We now have the wax model covered up approximately to the point at which the cementum joins the enamel.

Fig. 12.

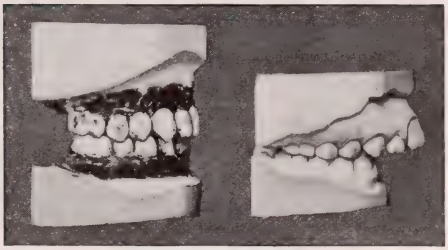
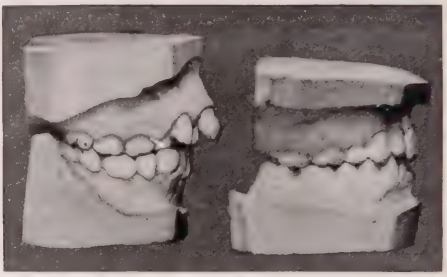


Fig. 5 is an illustration of a small oval post bar inserted here to show its construction.

Fig. 13.

Fig. 6. Having melted out the wax from the impression form, we have an impression of each individual tooth, into which is poured Melotte's metal, and while it is molten the little post is inserted to engage the metal. The cross-bar is inserted in the metal to make the post stable. If there is not a satisfactory film of plaster between the teeth, fill the alternate tooth impression with moldine, pour one tooth at a time, then remove the moldine and paint the exposed metal of the adjacent teeth with a thin

Fig. 14.



coating of plaster, so that the new metal will not stick to them. Having poured the metal into each individual impression, paint the posts and exposed surfaces of the metal teeth with thin plaster, then pour a metal base to preserve the relation of the teeth to each other.

Fig. 7 shows a model the teeth of which are removable.

Fig. 15.

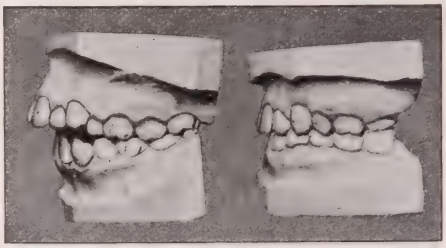


Fig. 8. An appliance has been made on this model.

Fig. 9 shows the upper and lower models in occlusion.

Fig. 10 is a lateral view of the same models.

Fig. 11 shows an arrangement of the teeth by taking them off their base, putting them in an articulator, and placing

them in the position into which I believe I shall necessarily have to move them to get normal occlusion.

Fig. 12 is a lateral view of the same case. The second molar was not constructed in this model.

Figs. 13, 14, 15 are models which represent the most desirable forms of malocclusion that I could obtain from a mutilated case. I have simply produced in an articulator the various possible combinations of the metal teeth, and chosen the best. There are mutilated cases in which I believe it would be impossible to establish normal occlusion. If it is inadvisable to reopen spaces to get what constitutes a normal occlusion, then what is the most desirable form of malocclusion? This enables you to make a study of what might be the most desirable form of malocclusion, and with this model you have a guide. Angle gave us a guide in the treatment of malocclusion, which guide was normal occlusion. This method of reproducing teeth in metal is a guide in those cases in which normal occlusion is impossible or inadvisable. These are usually mutilated cases and are few in number, but constitute the real test to the orthodontic specialist.

One of these models represents a construction from the impression sent to me by a dentist. I completed my metal model, made an appliance, and sent it to the dentist. He placed the appliance in position. I wrote my directions for treatment by him, and in two months' time he will send me another impression. I shall then take these teeth from that model and put them in the new impression, form a new base and get the then present position of the teeth. I shall make a new appliance, send it to him and he will place it in position. In two months' time he will send me another impression and I shall repeat the operation, sending him an appliance that will fit that model and the mouth.

The question in my mind is whether I can treat a case of malocclusion correctly without seeing it. I have three cases which I am treating at the present time. I do not claim positively that it can be done, but I claim there is a possibility.

If there is any period of the treatment which is slow, tedious, and most difficult, it is the final settling down of the teeth after you have practically brought them into normal occlusion. I believe that if I make an appliance on that model with the teeth arranged in normal occlusion, I can get an appliance that will encourage those teeth to settle down more rapidly than they will in any other way. If there is any variation in teeth, as there is bound to be, and we make a set of these cast teeth and place them in an articulator and endeavor to get normal occlusion, we shall soon discover the anomalies and the difficulties involved in the case. In this particular instance (Figs. 11 and 12) I arranged the teeth several times in what was to me normal occlusion, and I always seemed to arrive at the same position in regard to the shape of the arch.

Fifth and Franklin sts.

[See also *Discussion*, as reported under "Proceedings of Societies," this issue.]

Iodo-Glycerole.

By EUGENE S. TALBOT, M.D., D.D.S., Chicago, Ill.

FROM time to time there appears in dental journals and text-books my formula for "Iodo-glycerole," without giving me due credit. A certain professor in one of our large university dental schools, when lecturing upon the subject of so-called Pyorrhea, gives the prescription to the students as his own. Another professor has published the formula in his text-book as his own, and has given it to a commercial house under his name to manufacture and sell to the profession for gain, when it was given by me to the profession many years ago without money and without price.

My reason for this article is that the preparation is so efficient and is now almost universally used; if every writer on the subject of so-called pyorrhea mentions the prescription without due credit, the author's name will soon be forgotton in relation to it.

In 1878 the author first began to experiment with different drugs in connection with his researches upon "Interstitial Gingivitis and Pyorrhea Alveolaris." At that time he was getting splendid results with the officinal tincture of iodin. It was not entirely successful, for the reason that, when continued for a length of time, in some cases the mucous membrane became sore and the tissue was destroyed. Again, the tincture of iodin when in contact with the saliva would spread over the tissues of the mouth and was difficult to control. I wished to use an astringent to contract the gum tissues, and I found it impossible to use other drugs to dilute or strengthen the preparation and to make a clear solution. In consulting my friend the late Professor Hallberg, dean of the School of Pharmacy of the University of Illinois, he suggested that, if glycerin was added, other drugs could be used and water be added to make any strength of solution required, and one unharmful to the tissues.

Iodin crystals and zinc iodin were used in place of the tincture containing the alcohol, and water could be added in any quantity to dilute the preparation to any strength.

The mixture of iodin and glycerin was first made by the author, in 1880, and was called "Iodo-glycerole." The use of glycerin, and glycerin only, allows all the preparations of iodin to be made into clear mixtures—which cannot be done without it.

Certain persons have added potassium iodid or other drugs, or a few drops more or less of water, in order to claim originality. When, therefore, a formula of iodin, no matter in what form, and glycerin, is used, to that formula should be added the name "Talbot."

I take it that every dental school in the country has a professor on "ethics," and that the dental graduate is as familiar with the ethics of his profession as the medical graduate. If, however, the professors in our schools ignore the rules of courtesy and ethics, we can hardly expect the dental graduates to do so. It is high time that dentists, if they desire to be known as a profession, should at least learn the "golden rule."

31 N. State st.

A Dental Anomaly: Report of a Case of a Rudimentary Impacted Lower Third Molar.

By HARRY J. FELDMAN, D.D.S., First Lieut. D.R.C., U.S.A.,
DENTAL INTERN LINCOLN HOSPITAL, NEW YORK CITY.

A MALE patient, seventeen years of age, presented at the dental clinic of Lincoln Hospital with a large swelling in the region of the angle of the mandible, right side, with considerable trismus and glandular involvement.

The condition had commenced six weeks preceding his visit, and had been growing worse. During that time the patient had been to several dentists and physicians, and repeated incisions had been made in the lower right molar region and extra-orally at the angle of the jaw.

Upon examination the second molar was found to be very badly broken down, no third molar having yet erupted. The extra-oral incision was still suppurating, making it evident that nothing short of immediate treatment would halt the suppurative process and allow the patient to open the mouth.

The second molar, being the apparent cause, was promptly removed under mandibular anesthesia, induced by the aid of a mouth-gag. Before removing the tooth, considerable pus was evacuated by incising along the buccal fold.

Upon probing the alveolus of the second molar, however, it was noticed that there was no appreciable dissolution of bone—which surely ought to have occurred if the quantity of pus evacuated emanated from that source.

This led to an exploratory incision into the third molar region and determined the presence of the cusps of an impacted third molar deeply embedded in the retro-molar fossa, pointing externally.

A flap of tissue was then elevated from the ramus and retracted by the nurse. After considerable chiseling and drilling the tooth was extracted. Upon first examination the tooth gave the appearance of having been broken off with the apices left in the ramus. What appeared for the moment to be a piece of hanging gum tissue, and which was hurriedly washed away to examine the tooth, proved to be the developmental sac, and the soft pulp tissue within the hollow unformed roots was the dental papilla.

Cases of this character, where early impaction prevents development and soon induces with it concomitant conditions such as suppuration, glandular involvement, and trismus, endanger the life of the patient, and point to the necessity for early procedure as a prophylactic measure against systemic infection and prove that too long waiting for suppuration and trismus to subside is contra-indicated. The mouth-gag should be employed at once in such cases to eliminate the possibility of trismus becoming worse.

As another prophylactic measure it may perhaps also be wise to radiograph the other third-molar areas and study their progress, as symmetrical occurrence is very probable.

Correspondence

Sterilization of Tooth Tissues with Silver Nitrate.

To the Editor of the Dental Cosmos:

Sir,—The article entitled "A Method of Sterilizing, and at the Same Time Impregnating with a Metal, Affected Dentinal Tissue," by Percy R. Howe, A.B., D.D.S., in the September Dental Cosmos, I found to be extremely interesting. May I sound a word of warning, however, in regard to the use of silver nitrate in the roots of anterior teeth? I have several patients for whom I treated anterior roots, prepared for pivot crowns, with silver nitrate some ten years ago. Subsequently the gum tissues over the roots darkened as the result of the impregnation of the silver salt, causing a most disagreeable impression, and for that reason I discontinued its use in these teeth. I have found silver nitrate very effective when applied to affected tooth tissues which are not exposed to light, as advised by Dr. Black, but even if applied only to the apical third of anterior roots, the danger of staining the crown of the tooth, with its attendant disastrous results from an esthetic point of view, more than offsets the benefits derived from its use in these places.

Very truly yours,

Wm. H. Nitzschke, D.D.S.

Rio de Janeiro, Brazil.

Unclean Yet Sound Dentures.

To the Editor of the Dental Cosmos:

Sir,—Regarding the saying that "A clean tooth never decays," I would add "Neither does a dirty one, necessarily."

I recently spent practically a whole afternoon cleaning a set of thirty-two teeth, all perfect and in good occlusion, in a patient, a rather good-looking young woman just past thirty years of age. Tartar was present to such an extent that it formed almost a solid wall with vertical cracks to indicate the presence of the teeth. The tip of the upper cuspid was all that showed on one side. The sulci of the molars on the right side, both upper and lower, were completely filled with tartar. The patient said she had showed them to a dentist once, and he looked "kinda funny." I presume he did!

Very truly yours,

F. A. Graham, D.D.S.

Harbor Springs, Mich., October 6, 1917.

Dentistry as a Career.

To the Editor of the Dental Cosmos:

Sir,—I have before me a question to determine which I have often wondered how I should settle did it ever come to my lot to decide. It now appears in the form of the question of the career to advise for a *protégé* of mine, my young nephew, who is completing his academic education. By reason of his talents and personality I am convinced I should advocate for him either the profession of medicine or the profession of dentistry, in either of which I am satisfied he would make no small success, and one or the other of which he desires to take up. I have often wondered what would be the result if the average were struck from the sum of advice given by a representative number of dentists regarding such a matter. Would the nature of this average advice mean that dentistry as a factor for human good was a success or a failure? Would it mean that dentistry as a developer of character—taken in the broad sense—warranted the devoting of a life to it, rather than to the practice of medicine?

The following represents to my mind the way in which the successful dentist views his profession: He regards it as at present but a pioneer in the realms of public appreciation, recognition, and human service. He believes that its possibilities as a healing art and science—not *the* "healing art"—are practically unlimited. He realizes that it is no longer but little more than a mechanical trade and only in theory a profession. But as he considers these facts his thoughts seem always to point toward the same idea, namely, that dentistry is a specialty of medicine practiced without the degree of Doctor of Medicine, unlike the other specialties of medicine. Now, if, as it appears by natural and logical reasoning, dentistry is to be eventually absorbed into medicine, should not the education of the future dentist be the same as that of the medical student, with an added year or two or more if necessary to obtain the requisite dental qualifications? Would this not at one stroke raise the status and broaden the usefulness of dentistry? Then why not so educate the coming generations for the practice of the specialty of dentistry? I think this is a question of sufficiently imminent import to warrant a very free and full discussion in the forum of our dental magazines.

Cordially yours,

Wm. H. Barnhard, D.D.S.

Washington, D. C.

PROCEEDINGS OF SOCIETIES

New Jersey State Dental Society.

Forty-seventh Annual Convention, held in Atlantic City, N. J., July 11 to 13, 1917.

WEDNESDAY—*Morning Session.*

THE forty-seventh annual meeting of the New Jersey State Dental Society was called to order at 10 A.M., on Wednesday, July 11, 1917, on Young's Million Dollar Pier, Atlantic City, N. J., by the president, Dr. James I. Woolverton.

The Rev. HENRY MERLE MELLEN, Atlantic City, invoked divine blessings on the deliberations of the society.

The PRESIDENT. Mayor Bacharach of Atlantic City is absent from the city, and Mayor Harcourt of Longport will deliver the address of welcome.

Address of Welcome.

Mayor HARCOURT of Longport then addressed the society as follows:

Mr. President and members of the New Jersey State Dental Society,—Mayor Bacharach has requested me to come here and greet you this morning on behalf of Atlantic City. Mayor Bacharach would have been here; he is very faithful in the performance of his duties to the visitors and to the conventions which honor this city with their visits and who have contributed so much to make this the wonderful City by the Sea. But this time he is not with you because he has been called away to perform duties which are very burdensome, involving the mobilization of the military forces of the state and the preparations for the entrance of this state with the federal forces in the great conflict to make the world a safe place for the great masses of its people, and a very unsafe place for a few of its people who would destroy the freedom of the masses. I believe you will forgive his absence this morning when I offer you these reasons.

The duty which every individual owes to this state and nation during these dark days has been quickly recognized, and, I am glad to tell you, unselfishly and patriotically performed, by the members of your profession and of this society, resident in this city and county.

An instance of this performance of duty on your part was on the formation in this city of a battery of artillery as a unit of the New Jersey regiment of artillery. Many of the men who came forward and offered themselves to the company were found to be defective because of bad teeth. Immediately the dentists of this city and county came forward and volunteered to give their time and service to these men, so that one of the most important parts of the fighting man would be sound and ready for the campaigns to come.

Men like you, who do these things quietly and without the blare of a brass band, are not often the recipients of medals nor are such acts often mentioned in the news of the day, but it is nevertheless a performance of duty and exhibition of sacrifice just as laudable and every bit as necessary for a successful and quick finish of this war in which physical science is playing such a large part, and divine science such a small part. Future

wars must be prevented by the scientific application and enforcement of the principle of right over wrong, but this war will be won by the nation most highly developed and organized in physical science; that nation will be the United States, and your profession is doing and will continue to do its part.

I present to you the key of Atlantic City. Henceforth the doors are wide open, but don't take them off the hinges, because when the time comes that people must leave us we always lock the doors again, so that you can have an excuse to prolong your stay. Your president has just told me that during the last two days no one has been getting to bed until four or five o'clock in the morning, and that he realizes that he is up against it until this convention closes. He feels his responsibility so keenly that I know this key will be in safe hands. Mr. President, I present to you the key of Atlantic City.

The President. I accept this key in the name of the New Jersey State Dental Society, and will see to it that the doors are kept open.

The Secretary proceeded to call the roll, whereupon Dr. Manning moved that the roll-call be dispensed with. (Motion carried.)

The President. The secretary will read the minutes of the last meeting.

The Secretary proceeded to read the minutes of the last meeting, whereupon, on motion (as follows), further reading of the minutes was dispensed with.

Dr. Fowler. Mr. President, I move that the printed minutes of the meeting, as printed in the official record, be accepted as the minutes of the meeting. (Motion carried.)

Dr. Asher S. Burton, vice-president, was called to the chair, while the president, Dr. Woolverton, read his address, as follows:

President's Address.

By Dr. J. I. Woolverton, Trenton, N. J.

You have honored me with the privilege of addressing you as president of the New Jersey State Dental Society, and of bringing to your attention such matters as may be deemed of importance to the welfare of our society, by which it may maintain its position as a leader, not a follower, among dental societies.

To hold this place will even more in the future require that we use judgment in the selection of our officers. They must be men who are capable, willing to sacrifice themselves, and to devote the time that is necessary to carry on this work, not men who are seeking honors only.

During the past few years, owing to the increased demands for space necessary to accommodate the exhibits of the convention, there has been considerable difficulty in securing a place of sufficient size to house the entire meeting under one roof; in fact, last year it was necessary, as you know, to have the scientific meetings in a separate hall.

This year we were unable to secure the Casino in Asbury Park, where we held the last two conventions, forcing us to look for another place for the meeting of 1917.

In 1911 the Atlantic and Southern, and in 1912 the Atlantic, Southern, and Mercer societies held successful and well-attended meetings in Atlantic City. This was brought to the attention of the Board of Trustees, who, after some negotiation, have secured a favorable contract from this city.

This change has already proved beneficial from a financial standpoint, and the indications are that there will be no falling off in attendance. With such men as Drs. Price of Cleveland, Thoma of Boston, and Moffitt of Harrisburg, as essayists, and an excellent group of clinicians, this should be the most successful meeting the New Jersey State Dental Society has ever held.

An innovation in the management of the convention is being tried out this year in the appointment of a business manager, who has full control of the staging of the convention, relieving the chairman of the Exhibit Committee of a tremendous amount of detail work. This is working to such satisfaction that I would recommend the position be made permanent, that he be empowered to make all con-

tracts with the exhibitors and collect the moneys, with such other duties as may be directed by the Board of Trustees, and that he be compensated in a reasonable amount for such services.

DENTAL LEGISLATION.

The one hundred and forty-first session of the New Jersey Legislature passed no legislation affecting the law relating to the practice of dentistry, but has enacted a law directly affecting the appointment of members to the Board of Registration and Examination in Dentistry, in that it requires the society to name three dentists for each vacancy as it may occur, the Governor naming one for the position. This is sure to bring a certain amount of politics into the appointment, which is to be regretted. We must be more careful than ever in selecting men of high integrity and qualifications to fill these positions, to the end that the board may ever be an honor to the dental profession of New Jersey.

At the annual session of the society, a certain amount of business must be transacted; under the present plan every component society has a representative on the Board of Trustees, to bring the members in closer touch with the business of the society, and that the society may devote more time to the educational side of the convention; I would recommend that a complete record of the transactions at each meeting of the Board of Trustees be furnished them, to place before their local societies; also that the reports of the various committees—unless they contain matter to be discussed by the society—be read by title and printed in full in the *New Jersey Dental Journal.*

THE NEW JERSEY DENTAL JOURNAL.

This brings me to the *Journal,* whose staff is working for us every day in the year, and a good many nights until late, with no compensation whatever except our gratitude; let us show it by reading the *New Jersey Dental Journal,* if in no other way.

The history of the New Jersey State Dental Society is completed up to the time of reorganization, and it is recommended that a committee of three be appointed to bring it up to date.

MEMBERSHIP.

Our membership, while increasing steadily, should have a much larger proportion of the dentists of New Jersey. We can get them if each one of you will make it your business to bring in one new member; and to assist in this I recommend that a director of membership be appointed to carry on the campaign, with the slogan—"One thousand members at our fiftieth anniversary in 1920."

The National Dental Association is now sending to each member monthly a journal which reports the findings of the Research Institute. These alone are worth many times the price of the magazine, and the value of this work not one of us can estimate. The Research Institute is now asking that we increase our dues $1 per year for the support of this institution, and I most earnestly recommend that this be done.

THE PREPAREDNESS LEAGUE.

Of all the great events during the past year, the most important to us as a nation and professionally is the entrance of the United States into the European war. The national side needs no comment; we must win. Your Board of Trustees have taken such action as the conditions demand in the formation of the Preparedness League of the New Jersey State Dental Society, whose chairman will give a detailed report of the great work they have accomplished.

A portable motion-picture machine has been purchased that may be used in any place where the 110-volt current is available. This will be used at our state meetings, and will be loaned to the component societies who may wish to secure it. There are now nearly a dozen films available through the courtesy of the S. S. White Co., and many more that may be rented at a moderate figure. I would recommend that a committee of three be appointed to take charge of this machine and make arrangements for its use.

In conclusion, I wish to express my appreciation of the hearty support of the officers and the Board of Trustees during the past year, of the services rendered by your faithful and efficient secretary, Dr. John C. Forsyth, and Dr. George W. Wakeley, who will always find the place where there is work to be done.

May we all work together for the honor and prosperity of the New Jersey State Dental Society!

Dr. BURTON. You have heard the address of the president of the society. What is your pleasure?

Dr. WILKINS. Mr. President, I move that a committee of five men be appointed to act on the president's most excellent address. (The motion was carried.)

The following were appointed members of the Committee on the President's Address: Drs. Wilkins, Heckman, Stevens, Egel, and Rice.

Dr. Woolverton then resumed the chair.

The PRESIDENT. We will next have a report from the Committee on Necrology.

Dr. J. G. HALSEY, Swedesboro, then presented the

Report of the Committee on Necrology.

Your Committee on Necrology begs leave to submit the following:

During the year 1916 our Heavenly Father has called the following six members of the New Jersey State Dental Society to lay down their implements here on earth, and enter into that mysterious realm which is beyond our view, into which we must all at last enter, to give an account of our stewardship and to be rewarded according to our deeds, whether good or evil.

Dr. ELLISON ST. J. STACPOOLE, Fort Lee, N. J.; graduated from New York College of Dentistry in 1910; joined the State Society 1916; died February 1916.

Dr. EDWARD T. TAYLOR, South Orange, N. J.; graduated from New York College of Dentistry 1897; joined the State Society 1908; died January 2, 1917.

Dr. S. B. JOHNSON, SR., Dover, N. J.; began practice 1886; joined the State Society 1912.

Dr. JOHN S. BARRETT, Morristown, N. J.; graduated from New York College of Dentistry 1908; joined the State Society 1909; died January 1917.

Dr. FRANK W. FRENCH, Plainfield, N. J.; graduated from New York Dental School, 1899; joined the State Society 1912; died May 1917.

Dr. A. B. DEWEES, Camden, N. J.; graduated from Pennsylvania College of Dental Surgery 1895; joined the State Society 1908; died May 19, 1917.

As these names were being read some of us recall a relative, a friend or a neighbor, but to us all they were brothers. Therefore, as we pause for a brief space of time from our regular business to pay our last and heartfelt respect to these brothers, let us cherish their memories by remembering the many kind deeds they have done, the many noble acts they have accomplished.

Their work has been accomplished, their labors ended, and they are entitled to their rest. Let us remember them as friends we were delighted to meet, as companions who helped us to help others, and as co-laborers who have earned their reward.

JOSEPH G. HALSEY,
CHAUNCEY M. F. EGEL,
GEO. M. HOLDEN,
Committee.

RESOLUTIONS.

Whereas, by an act of Divine Providence, since our last meeting we have sustained the loss of our fellow member* ———————— and

Whereas, it is the desire of our society to record appreciation of his association with us, and for his friendship; therefore be it

RESOLVED, That we, the members of the New Jersey State Dental Society, feeling deeply the loss we have sustained, hereby express our sorrow and our sympathy for the bereaved family; therefore be it

RESOLVED, That these resolutions be placed upon the minutes of this society, and that a copy be sent to the family.

Dr. JONES. I move that the report be received and spread upon the minutes.

Dr. FOWLER. I move an amendment to the effect that copies of the resolutions be engrossed and forwarded to the families of the deceased. (Carried.)

* These resolutions were repeated for each deceased member.

Dr. A. S. Burton, of the Committee on Board of Censors, announced that the committee had no special report to make.

Dr. Edwin R. Morris made the following report from the Committee on Oral Hygiene:

Report of the Committee on Oral Hygiene.

Mr. President and gentlemen of the State Dental Society of New Jersey,—Your Oral Hygiene Committee reports having held one meeting, at which time there were ten members present.

The duty intrusted to this committee as indicated by your favorable note on the matter of the compilation of a pamphlet or booklet, suitable for distribution to the laity, upon the subject of Oral Prophylaxis and Preventive Dentistry, has been accomplished.

Your committee begs to report the collection of sufficient data to formulate such a pamphlet, but feels that, inasmuch as the subject is such a broad and vital one, a special committee of five members should be appointed to edit the copy submitted by the Oral Hygiene Committee.

Dental clinics throughout the state report almost double the number of patients and operations over last year's report.

Your committee also reports having been instrumental in assisting in the preliminary work in many localities where dental clinics are about to be established.

The members of your committee have given many lectures in civic centers in their own localities upon the subjects of mouth hygiene and proper care of the teeth.

Your committee wishes to express the great need of live committees on Oral Hygiene in all of the component societies for the purpose of stimulating interest and enthusiasm in this important propaganda which will shortly be upon us.

The subject of the care of the mouth and its contents is now engaging the minds of those foremost in medicine, and presently there will be precipitated upon us a responsibility which we cannot in any way evade. Therefore your committee asks renewed individual enthusiastic support to the Oral Hygiene propaganda, to the end that Jersey may maintain a coveted position.

Such data as could properly be used in lectures, addresses, or discussions relative to the hygiene of the mouth is in the hands of your committee, and will be turned over to its successors for your use on any occasion requiring it.

Your committee feels it to have been a distinct pleasure and privilege to have served the society, and we severally urge an earnest continuance of the work which was turned over to us by the former committee in such a splendid manner last year.

Respectfully submitted,

Edwin R. Morris. *Chairman.*

Dr. Welsh. I move that the report from the Committee on Oral Hygiene be accepted and recorded in the minutes. (Motion carried.)

Dr. A. L. Westcott, for the Committee on Entertainment, reported on the arrangements made to entertain the members of the New Jersey State Dental Society at Turner Hall on Friday evening at 8.30 with a smoker, to which the members and exhibitors in attendance at the convention were invited.

Dr. C. M. F. Egel made the following report from the Legislative Committee:

Report of Legislative Committee.

During the last winter there were two bills introduced in the legislature that directly affected the profession of dentistry. One aimed to lower the standard of preliminary education. Your committee asked for a hearing on the bill, which was granted, and after presenting the arguments against this bill, it was killed in the committee that it was referred to—the Public Health Committee.

The other bill was a party measure and a blanket bill to cover all the professions in the state, making it mandatory upon them to name three men for each vacancy in their boards of examiners. This bill was passed. We would have preferred to have had the law remain as it was in regard to our profession, as this makes the appointment more of a political measure, but realize that our safety is in naming men eminently qualified for the position.

Respectfully submitted,

Chauncey M. F. Egel, *Chairman.*

Dr. Hopkins moved that the report be accepted and spread upon the minutes. (Motion seconded and carried.)

Dr. John C. Forsyth, secretary, read the report of the Committee on State

Board of Registration and Examination in Dentistry.

Dr. HOPKINS, in view of the fact that these items had been published in the *New Jersey Dental Journal,* moved that the reading be dispensed with, and that the report be embodied in the minutes of the convention. (Motion carried.)

The next order of business was the report of the Exhibit Committee, by G. W. WAKELEY, chairman, as follows:

Report of Exhibit Committee.

Your committee wishes to report a most successful exhibit. We have sold nearly eight hundred running feet of space, and collections have been very satisfactory. As chairman of the committee, I wish to express my sincere thanks to those who have helped to make the exhibit the record-breaker that it is.

G. W. WAKELEY, *Chairman.*

Dr. J. G. HALSEY, chairman of the Committee on Ethics, reported as follows:

I believe I am the chairman of the Committee on Ethics. The most favorable report that the committee can make is that there is none to give. I have heard nothing to the contrary from any of the other members of the committee.

Dr. JONES. Mr. President, in appreciation of the important aid rendered to this society by the officers of the Society for the Suppression of Vice and Imposture, I move that the thanks of the New Jersey State Dental Society be extended to those officers for their valuable services. (Motion carried.)

On motion the convention adjourned until 8 P.M.

WEDNESDAY—*Evening Session.*

The president, Dr. Woolverton, called the convention to order at 8 P.M.

The PRESIDENT. We have with us tonight a gentlemen whom you all have heard, and many of you have read his works—Dr. KURT H. THOMA of Boston, Mass., who will read a paper on the subject of "The Histological Pathology of Alveolar Abscesses and Diseased Root-ends."

[This paper is printed in full at page 13 of the present issue of the DENTAL COSMOS.]

Dr. ALBRAY. Mr. President, I move a vote of thanks be extended to Dr. Thoma for his excellent paper. (Motion seconded and carried.)

The society then adjourned until Thursday, at 9 A.M.

THURSDAY—*Morning Session.*

The President called the convention to order at 10 o'clock.

The PRESIDENT. The next business in order is the nomination and election of officers to serve for the ensuing year. There are to be elected a president, vice-president, secretary, treasurer, and after these officers are elected we choose members by ballot to be recommended as members of the Board of Registration.

ELECTION OF OFFICERS.

The result of the election was as follows:

President—Dr. R. A. Albray, Newark.

Vice-president—Dr. George W. Wakeley, Orange.

Secretary—Dr. John C. Forsyth, Trenton.

Treasurer—Dr. J. G. Halsey, Swedesboro.

Nominations for Examining Board—Dr. John C. Forsyth, Trenton; Dr. F. L. Manning, Red Bank; Dr. S. I. Callahan, Woodstown; Dr. Franklin Rightmire, Paterson; Dr. R. B. VanGieson, Montclair; and Dr. G. H. Grim, Jersey City.

Delegates to the National Dental Association—Dr. C. M. F. Egel, and Dr. W. H. Gelston.

The list of nominations for the Board of Trustees of the State Society was as follows:

M. B. Shoemaker (Atlantic Co. Soc.); A. Zabriskie (Bergen Co. Soc.); E. C. Stillwell (Central Dental Association); R. A. Albray (Clinical Club); W. J.

Webster (Hudson Co. Soc.); Geo. W. Wilkins (Mercer Soc.); W. W. Hodges (Middlesex Co. Soc.); F. L. Manning (Monmouth Co. Soc.); J. B. Keller (Passaic Co. Soc.); C. M. F. Egel (Plainfield Soc.); W. H. Gelston (Southern N. J. Soc.); L. R. Fritz (Tri-County Soc.); S. M. Hinman (Union Co. Soc).

Adjourned until 8 P.M.

THURSDAY—*Evening Session.*

The meeting was called to order at 8 P.M. by the president, Dr. Woolverton.

The PRESIDENT. We have with us Dr. WESTON A. PRICE of Cleveland, Ohio, president and managing director of the Research Institute of the National Dental Association, who will now address you on the subject of "Some Lessons Growing Out of Recent Studies of Oral Infections."

Dr. Price gave an extensive extemporaneous lecture on the work done by the Research Institute of the National Dental Association on the relation of oral infections to systemic diseases.* In closing this lecture Dr. Price made an appeal for support of the Research Institute, as follows:

Dr. PRICE. I want to thank you, gentlemen, and I would like to take just a minute to tell you how and where the work of the National Research Institute at Cleveland is carried on, and how it is being done. The work done in Cleveland is but one part—and a very small part—of the work that is done by the Institute. We have only a staff of four or five people, and we should have five times as many workers. The higher class of work has been supported in nine different cities by such workers as Dr. Hartzell in Minneapolis, who receives twenty-four hundred dollars, and Dr. Marshall, who receives three hundred dollars and is devoted to the study of saliva and dental caries; Dr. Frederick S. McKay of Colorado Springs, three hundred dollars; Dr. Noyes of Chicago, four hundred dollars; Dr. Dunn of Ann Arbor and Dr. Prinz of Philadelphia receive five hundred dollars; and Dr. Howe of Boston and Dr. Callahan of Cincinnati—and all these men and all that work have been available simply through contributions of the dental profession. This work has been done outside by these men with contributions from three thousand men in the dental profession, and your splendid state, I think, had five subscribers of the three thousand. Without this support this work could not go on. We have, however, received from your state or from your organization the splendid contribution of last year of five hundred dollars to the National Association; one hundred dollars of that for the Research Institute for which we are a thousand times grateful to you. Work cannot be continued on the direct basis, and therefore it is being transferred to the universal one-dollar basis. Seventy-five per cent. of the dentists in the United States in the National Dental Association have made their arrangements to have the work continued on the one-dollar basis and have taken favorable action, and others cannot do so until an amendment is adopted at their next meeting, for their constitution in some cases will not let them do that without that action. Your society has not taken action. I trust your officers will give you an opportunity to do so. Do you want them to do so? Do not applaud unless you want the officers to do so.

Dr. ALBRAY. Mr. President, I move you that we extend a vote of thanks to the essayist for the splendid address to which we have listened this evening. (The motion was unanimously carried.)

Dr. PRICE. I thank you very much, but I would a great deal rather have you take a vote on the other proposition.

The PRESIDENT. All in favor of raising the dues one dollar for the benefit of the Research Institute remain standing.

(Most of the members in the hall remained standing.)

On motion, the meeting adjourned until Friday morning at 9 o'clock.

* [This is not published here for the reason that we have not received revised manuscript of the lecture.—ED.]

FRIDAY—*Morning Session.*

The President called the convention to order at 9.30 A.M., and introduced Dr. J. J. MOFFITT of Harrisburg, Pa., who addressed the members on "The Treatment and Filling of Root-canals for the Prevention and Cure of Alveolar Abscess."

[This paper is printed in full at page 1185 of the December issue of the DENTAL COSMOS.]

The PRESIDENT. You have heard the address of Dr. Moffitt; what is your pleasure?

Dr. HOPKINS. I move a vote of thanks to Dr. Moffitt for his splendid paper. (Motion carried.)

The PRESIDENT. In order to carry out the wishes of the convention, a motion to postpone for the present the report on the President's Address and go on with the business of considering the proposed new amendments to the Constitution is in order.

Dr. HODGES. Mr. Chairman, I move that we postpone for the present discussion and consideration of the recommendation of the Committee on the President's Address, and go on with the business of the adoption of the proposed new amendments to the constitution.

Dr. FOWLER. Mr. Chairman, I second the motion. (Motion carried.)

Dr. GELSTON then read the proposed amendments to the Constitution and By-laws, and moved their adoption. (Motion carried.)

Dr. GELSTON. Mr. President, I move the adoption of the Constitution and By-laws as a whole. (Motion carried.)

The PRESIDENT. The Secretary will read a letter from Dr. Logan, of the National Dental Association, on the Black Memorial.

The Secretary read the letter, as follows:

CHICAGO, Ill., June 20, 1917.

Dear Dr. Woolverton,—Just a brief note to convey my best wishes for a successful State Dental meeting and to ask as a favor on behalf on the Black Memorial Committee that you urge the New Jersey members of the National who intend to contribute to this fund to give it their prompt attention. If your officers think it wise to consider a contribution of one or two hundred dollars from the State Society treasury, allow me to inform you it would be greatly appreciated.

Besides the individual contributions we have received from the Illinois State Dental Society one thousand dollars, one thousand from the Chicago Dental Society, two hundred from the Iowa State Society, two hundred from the Ohio State Society, two hundred from the Minnesota State Society, two hundred from the New York State Society, one hundred from the Missouri State Society, three hundred from the Indiana State Society, one hundred from the Second District Society of New York, and fifty dollars from the American Dental Club of Paris.

Fraternally yours,

W. H. G. LOGAN, *Chairman.*

The PRESIDENT. It would seem to me desirable that this society appropriate a certain amount of money for that purpose, and a motion to that effect would be in order. What is your pleasure?

Dr. FOWLER. Mr. President, the object for which this letter is written is a worthy one. It is of importance to the dental profession of this country, and we as a society feel that we must do our part in aiding this sort of thing—paying to honor the men who have blazed the trail. I therefore move that $100 be appropriated for the purpose indicated in the letter which has just been read by the secretary.

Dr. BARRY. Mr. President, I second the motion. (Motion carried.)

The PRESIDENT. We will next hear the report from the Auditing Committee.

Dr. HILLMAN. Mr. President, the Auditing Committee has examined the reports of the Secretary and Treasurer, and finds them correct.

WM. TALBOT,
F. K. HEAZELTON,
G. H. HILLMAN,
Committee.

Ordered to be embodied in the record.

The PRESIDENT. We will have a report from the Preparedness Committee, by Dr. Stevens.

Dr. STEVENS then read the following report:

Report of Preparedness League Committee.

The New Jersey dentists were the first to register. The committee, through Dr. Forsyth, has about completed an inventory of the free dental clinics of the state.

Out of 1629 dentists in the state cards have been returned from 1197. These men have offered to place the mouths of 4941 recruits in fit condition, and to give 2191½ hours per week for any dentistry work the Government may require. Of the 1197, 344 have signified their willingness to serve in a base hospital or the dental corps, and 636 have signified their willingness to work for the conservation of the practice of a brother dentist who may be serving at the front.

An inventory of all the surplus dental instruments in the state has been made by this League.

J. B. Stevens, *Chairman.*

Dr. Stevens. I move that this committee or the chairman of this committee be requested to work in conjunction with the National Preparedness League, in so far as it possibly can. (Motion carried.)

Dr. Gelston. Dr. Price has suggested that it would be well to send the check for the Research Institute of the National Dental Association at Cleveland to the treasurer of that institution, and that it be embodied in Art. XIV, Sec. 2, of the Constitution and By-laws. This clause has been embodied in that section, and has already been adopted.

Dr. Barry. As you all know, the State Board of Registration and Examination this year is to be appointed practically under a new law; that is, the recommendation of three men by this convention to the Governor for each position, from which he accepts one, and makes the appointment. In order to clarify this matter, and in order to make it perfectly legal, since the adoption of the amendment to our Constitution and By-laws, I would like to make this motion, in order that we may be working along the proper line, and so that we will not get into legal difficulties with reference to this matter.

I therefore move that we ask the President of this association to recall and reconsider the announcement made by him to this convention deciding that certain men were elected for recommendation to the Governor at yesterday's (July 12th) session.

Dr. Albray. Mr. President, I second the motion. (Motion carried.)

The President. We will now have the report from the Treasurer.

Dr. Jones. Mr. President, I have two reports, one as the treasurer of the Indigent Members' Fund, and the other that of the New Jersey State Dental Society. I will now read the Fund report:

Report of the Treasurer of the Indigent Members' Fund.

To the President and Members of the New Jersey State Dental Society:

Ladies and gentlemen,—The treasurer of the Indigent Members' Fund begs leave to report as follows: That carrying out the wishes of the society at its last annual meeting held in Asbury Park, ten shares of building and loan stock of the Rail and Harbor City Building and Loan Association of Elizabeth, N. J., of a par value of $2400, was subscribed for in the name of the Indigent Members' Fund of the New Jersey State Dental Society, and I have to report that during the year a dividend of 6 per cent. was credited on the shares; that $100 was appropriated to a widow; that a check for $150 was forwarded to Dr. Wayne Babcock of Philadelphia for surgical services rendered, but that out of the goodness of his heart Dr. Babcock returned the check, for which I think the society owes him a vote of thanks.

The Board of Trustees invested $500 of the fund in ten $50 3½ per cent. gold bonds of the Liberty loan; therefore the state of the fund is as follows:

Receipts.		
Balance as per 1916 report	$1,276.45	
Bank interest received during the year	37.46	
Total		$1,313.91
Disbursements.		
Rail and Harbor City Building and Loan Association, 10 shares and initiation fee	$121.00	
Widow	100.00	
Liberty loan	500.00	
Total		721.00
Balance		$592.91

Respectfully submitted,

Chas. F. Jones, *Treasurer.*

The PRESIDENT. You have heard the report by our Treasurer; what is your pleasure?

Dr. GELSTON. I move that we accept the report, with one exception—that in the report we strike out the name of the indigent member who is to receive the benefit from this fund, and that the report become a part of the records of this convention.

Dr. JONES. I accept the exception. (Motion carried.)

Dr. WILKINS. Mr. President, in the name of the New Jersey State Dental Society I have a most pleasant duty to perform. But a few years ago our machine was in danger of stopping, and at that time Dr. Jones became the pinwheel, and supplied the wherewithal with which to keep it from going backward. His services have been appreciated by this society, and in the name of our organization I want to present to him this token of our appreciation.

Dr. Wilkins, on behalf of the society, presented a handsome gold watch to Dr. Jones.

Dr. JONES. Mr. President, and fellow members, this is a great surprise to me. I did not anticipate anything of the kind, and certainly will prize this beautiful gift always. In thanking you I wish to add that I trust the work I have done has met with your approval, and feel that it must have been so, else you would not have made this handsome present to me. I thank you.

Dr. BARRY. In order to straighten out this matter with reference to six members recommended for the State Registration Board, I now move that the six men who received the highest number of votes and were selected at the meeting of yesterday, July 12th—Drs. Forsyth, Manning, Rightmire, Callahan, VanGieson, and Grim—be recommended to the Governor for the specified number of appointments, and that they now be declared elected by this convention.

Dr. GELSTON. Mr. President, I second the motion.

The motion was carried, and the president declared them elected.

The PRESIDENT. The next business in order is the report of the Committee on the President's Address. I will ask the president-elect, Dr. Raymonde A. Albray, to take the chair, and in the name of the New Jersey State Dental Society I now present him with the gavel. I wish to express to you, Dr. Albray, my good wishes, and hope that you may have the co-operation of the members and the Board of Trustees as I have had during the past year.

Dr. ALBRAY. Dr. Wilkins will report from the Committee on the President's Address.

Dr. WILKINS then read the following

Report of Committee on President's Address.

Mr. Chairman and gentlemen.—Your committee appointed to consider the President's Address submit the following report:

(1) The first recommendation contained in the address is "That the position of business manager be made permanent, with full control of the staging of the convention, empowered to make all contracts with the exhibitors, collect money on the same, with such other duties as may be directed by the Board of Trustees, and that he be compensated in a reasonable amount for such services."

(2) "That a complete record of the transactions at each meeting of the Board of Trustees be furnished to each component society, so that the society may devote more time to the educational side of the convention."

(3) "That the reports of the various committees, unless they contain matter to be discussed by the society, be read by title, and printed in full in the *New Jersey Dental Journal.*"

(4) "That a committee of three be appointed to bring the history of the New Jersey State Dental Society up to date, from the time of reorganization."

(5) "That a director of membership be appointed to carry on a campaign with the slogan—'One thousand members at our 50th anniversary in 1920.'"

We, the Committee on the President's Address, concur in the above recommendation, move its adoption, and further recommend that the director's assistants comprise the chairman of the membership committee of each component society.

(6) "That a manager be appointed to take

charge of the portable motion-picture machine owned by the society."

We, the Committee on the President's Address, concur in the above recommendations, and move their adoption.

L. M. Heckman,
Chauncey M. F. Egel,
J. B. Stevens,
Chas. A. Rice,
Geo. W. Wilkins,
Chairman.

Dr. Gelston moved that the clause in recommendation No. 1 be stricken out which states that the business manager shall make all contracts, but the chairman of the Exhibit Committee shall remain as previously and work in conjunction with the director or manager.

Dr. Barry. I second that motion. (Motion carried.)

Dr. Gelston. Mr. President, I move that the recommendations of the Committee on the President's Address to this convention be adopted as a whole.

Dr. Barry. I second the motion. (Carried.)

Dr. Forsyth. I have been requested to present the following resolution:

Resolved, That the New Jersey State Dental Society heartily indorses the bill adopted by the National Dental Association, July 27, 1916, which seeks to modify the status of the Dental Corps of the United States Army so as to increase the efficiency of the dental service to the Government, and bring to an end the existing discrimination against the profession of dentistry in the public service; and be it further

Resolved, That the amendment introduced by Mr. Lodge to the Bill (H. R. 4897) to amend Sec. 10 of the National Defense Act, approved June 3, 1916, and for other purposes, carrying out the purposes of the National Dental Association as heretofore recommended, be also indorsed; and be it further

Resolved, That the members of the New Jersey delegation in Congress be respectfully requested to lend their active support to the National Dental Association in its effort to accomplish this worthy object, and that the Legislative Committee and all other members of this association be instructed to use their best efforts to enlist the support of said members of the New Jersey delegation in Congress in behalf of this work; and be it further

Resolved, That a copy of these resolutions be transmitted to Senators J. S. Frelinghuysen and William Hughes, the congressmen of this state, and to Dr. Otto U. King, general secretary of the National Dental Association.

The President. You have heard the resolution; what is your pleasure?

Dr. Egel. Mr. President, I move that this resolution be adopted. (Motion carried.)

Dr. Chas. H. Spahn, chairman, presented the report of the Clinic Committee, as follows:

Report of the Clinic Committee.

By Dr. Chas. A. Spahn, Newark, Chairman.

Conduction Anesthesia. (By Dr. Hermann Prinz, Philadelphia; Dr. Walter F. Barry, East Orange.)

This clinic consisted of demonstrations of conduction anesthesia with the use of novocain. On both days the clinic was more than crowded, showing the interest in this particular branch of dentistry. In every case a minor surgical operation was performed, the patients being school children of Atlantic City. Those who attended this clinic were given the opportunity to perform the necessary operation upon the patients provided, all work being done under the direct supervision of the clinicians.

It is the intention of the Clinic Committee that demonstrations of this character be given so that men interested in a particular branch of dentistry should have the opportunity to perform some operation in that branch, under the direct supervision of capable instructors. It is thought that in this way the best results from clinics will be obtained.

An Original Method of Outlining the Arch for Orthodontic Procedure. (By Dr. Percy N. Williams, New York.)

Dr. Williams demonstrated an original method for outlining the arch for orthodontic procedure which seemed to create considerable interest. The demonstrations that he gave can be minutely

studied in July 1917 DENTAL COSMOS [see page 695]. This branch of orthodontia is now passing through an evolutionary stage, and it is suggested that those who are interested follow this branch of study in order to substantiate the work that our different investigators have given us to date.

MOUTH DIAGNOSIS. (By Dr. BERTRAM B. MACHAT, Brooklyn, N. Y.)

This clinic can truly be accepted by any dental organization throughout our country, being one of the newest and most accurate means of determining the internal conditions of a tooth and the surrounding parts based on scientific bacteriology, pathology, and physiology. It therefore has a direct bearing on the most vital topics discussed by all thinking medical men.

STEREOSCOPY, SINUS AND TOOTH RADIOGRAPHY. (By Dr. A. C. M. HERDLING.)

The ease and accuracy with which twenty-two plates were produced at the clinic prove conclusively the absolute necessity for the required equipment in every dental office, regardless of the branches in which the operators might be accustomed to labor, in order that intelligent diagnosis and treatment may be instituted.

THE RELATION OF SKIN MANIFESTATIONS TO ORAL FOCI. (By Dr. H. J. KAUFFER, New York.)

Dr. Kauffer showed a transparency three feet square containing the photographs of skin lesions, and radiographs of oral foci directly related to one another, with a statement of the importance of recognizing these conditions as they present themselves. This subject seems to be one that should be continued in our future clinics.

CORRECT IMPRESSION-TAKING. (By Dr. ROBERT H. LIEBERTHAL, New York.)

Fortunately, in this clinic we were able to secure a patient who had had ten full upper and lower sets of teeth made, the difficulty being entirely due to the lack of accuracy in securing the proper impressions. Correct impressions taken scientifically by advanced methods based on Greene's principle were demonstrated by the clinician to be a pleasing, satisfactory, and almost a guaranteed method of producing a denture that the patient eventually can use.

Criticism by the audience during this clinic was most favorable.

On motion the report of the Clinic Committee was received.

The PRESIDENT. Dr. Slade desires to address the convention.

Dr. A. R. SLADE. Mr. President, we have among us a certain number of dentists who through their patriotic sentiment have enlisted. There has been considerable discussion as to what was the best way to preserve their practice, in attempting to prevent their incurring unnecessary loss if they are able happily to return to it again. Many suggested plans are not feasible. While the proposition that I now present to you is not enough for those who wish to do their full duty by the League, it is practical, and I believe will be acceded to by all practitioners. The proposition is simply this: As soon as a dentist in a community enlists, the dentists in the vicinity will begin to keep account as to who was the previous dentist of every man or woman entering their offices. Upon the return of the dentist—if happily he returns—he shows a list of the names of his former *clientèle,* and each dentist who has worked for those patients gives him a list of them. And let the Preparedness Committee of this society be instructed to prepare a letter for the man who has attended these patients to address each one of them somewhat after the following manner: That Dr. So-and-so is pleased to announce that Dr. So-and-so, after having been in the government service and having happily returned, has resumed his practice at such-and-such a number on such-and-such a street, etc. The dentist, returning later, simply prepares an announcement that he has resumed practice on such-and-such a street. There is no semblance here of delivering patients. In other words, we speak of a

practice as perhaps an individually owned property. I do know that a practice is something tangible, and that to return to that dentist all individuals of that practice who desire to return to him will set him on his feet quicker than if he had to start life all over again.

For that reason I move that the Preparedness Committee be instructed to prepare two letters as outlined, and that the dentists of the state be appealed to and obligated, in so far as they will reply, that as soon as an individual dentist in any community enlists, they will keep a record of each new patient, and upon his return present to that dentist a list of the names of his patients who attend his office, and will send to each of such patients a letter as indicated, implying that the practitioner returns the patient to the returned dentist.

The motion was carried.

FORMAL INSTALLATION OF OFFICERS.

President Albray having been called to the chair, upon the presentation of the report of the Committee on the President's Address, when the president presented to him the gavel, now responded as follows:

President ALBRAY. *Mr. President and gentlemen of the convention,*—I appreciate the honor which has been conferred upon me, and I will endeavor to do everything possible to further the best interests of the New Jersey State Dental Society.

I wish to ask Dr. Wakeley, vice-president, to come to the platform, that I may introduce him.

Dr. Wakeley appeared on the platform, together with Dr. Forsyth, secretary-elect, and Dr. Halsey, treasurer-elect, and all were introduced by the president.

Dr. ALBRAY. Is there any further business? If not, a motion to adjourn *sine die* is in order.

On motion the convention adjourned *sine die.*

Eastern Association of Graduates of the Angle School of Orthodontia.

Eighth Annual Meeting, held in New York City, May 7 and 8, 1917.

(Continued from vol. lix, page 922.)

MONDAY—*Morning Session.*

(Continued.)

THE President announced as the next item on the program for the morning session the reading of a paper by Dr. MILO HELLMAN, New York City, entitled "The Relationship of the Sizes of the Teeth to the Form of the Dental Arch."

[This paper will appear in an early issue of the DENTAL COSMOS.—ED.]

The society then adjourned until the afternoon session.

MONDAY—*Afternoon Session.*

The meeting was called to order by Dr. Ferris at 3 o'clock.

Dr. J. A. CAMERON HOGGAN of Richmond, Va., presented a lecture on "Orthodontic Treatment of Advanced Cases and Patients Coming from a Distance."

[This paper is printed in full at page 45 of the present issue of the DENTAL COSMOS.]

DISCUSSION.

Dr. J. Lowe Young, New York. I have examined the casts and can see that

in cases of missing teeth—mutilated cases—results of considerable value might be obtained with this technique; but I hate to think of having to go to the trouble of making these metal dies for each tooth in the ordinary case of malocclusion.

Dr. Hoggan spoke about making an appliance for the case every two months from these casts, to be used by the dentist who was helping him to treat the case. I do not see why that should be necessary, unless the case was something very different from the ordinary.

Dr. G. W. Grieve, Toronto, Can. The idea many dentists have had for a long time is that they have only to wire the teeth to the appliance; it is not the appliance, but the man behind the appliance, that is the chief factor. I do not see how the work can be done by a dentist without any definite knowledge of orthodontia. It seems to me that the man who manipulates the appliances in the mouth of the patient should have a definite knowledge of the work, because he should be able to judge as to the effect of the action of the appliance.

Dr. J. V. Mershon, Philadelphia, Pa. I think Dr. Hoggan's whole thought in this matter was to present a technique which under many conditions and circumstances an orthodontist could make use of, and I think he has done it very well.

Dr. C. A. Hawley, Washington, D. C. There is no question that a case will be very much better treated if we can do it ourselves, and attend to all the technique; but I take it that is not Dr. Hoggan's proposition at all. There is going to be, and there is now, a great deal of orthodontia done by dentists in small towns. They think they have to do it, and it resolves itself into a proposition something like this: They will stumble along without any comprehensive idea of what they are doing, or else it will be done under the direction of some man who knows what should be done. I think a plan of this kind would enable a dentist to do the work better in certain situations. I do not think Dr. Hoggan has presented this as an ideal method, or one in which you would get the highest and most artistic results; but it is far better than for a dentist in a small town, who does not know much about it, to attempt it alone. For that reason it is a very good method.

The idea of arranging the teeth cut from a model goes, in a way, back to the old scheme we have seen so many times, of dentists sawing off teeth in the laboratory, and arranging them, and trying to get an idea of where they should go. No matter how efficient all our methods are for measuring the teeth and determining the arch, it is not as comprehensible to the average dentist as this method of making a cast of the teeth, and then rearranging them. You see the thing clearly before you, and you get a better understanding of it.

The defect in the method of sawing the teeth from a plaster cast and rearranging them lies in the fact that the plaster is friable, and you do not have, finally, teeth of the exact dimensions of those in the mouth. If the teeth can be reproduced accurately in metal and rearranged it would be valuable in studying possible results and procedure in treatment as well as for the fitting of appliances.

Dr. H. E. Kelsey, Baltimore, Md. I might ask Dr. Hoggan if he really meant that every two or three months he constructed a new appliance, or does he readjust the old one? It would mean a great deal of work on the part of the operator who is seeing the patient, as well as on Dr. Hoggan's part, to have a new appliance inserted every two or three months.

The President. Dr. Hoggan's technique is ingenious, and undoubtedly would be of assistance in determining a normal occlusion, but he makes one statement that, in view of our present information, strikes me as peculiar—*i.e.* that in most all cases teeth take the same arch form.

Dr. Hoggan. I said when I set the same case up half a dozen times, they assumed the same form.

The President. Then I misunderstood you, Dr. Hoggan. If a man can-

not read a plan, and the appliance is not intelligible to him, I think this method may be of assistance; but, personally, I see no advantage over a plaster model, unless it be for the adjustment of appliances. One of our New York men, Dr. Wilbur Dailey, fifteen or eighteen years ago read a paper before the Second District Dental Society, I think, in which he said he carved out all the plaster teeth and set them up in wax.

In studying cases of malocclusion we can see the buccal cusps and buccal inclined planes very readily by these methods, but we cannot see the lingual inclined planes. We also lose the position of the axis of the tooth. With little practice, one can become proficient in reading a plan, and then his evidence is measurable and positive, and is intelligible to a third party. That is the reason for architects and engineers developing plans and projections for a proposed structure. By Dr. Hoggan's method you must lose space in making the teeth, and Dr. Stanton's occlusograph shows that a 2 mm. error in tooth material is sufficient to throw a set of teeth out of occlusion. I commend the chart and plan method, and hope it will be universally adopted.

Dr. Hoggan (closing the discussion). I appreciate Dr. Hawley's expression of my position, that I am simply endeavoring to get a possible improvement in a condition that is unfortunate. I claim that orthodontia is an art, and I can with my hands do things much more rapidly than I could with machines or mathematics, but I do not pretend to say that anyone else could not utilize another system to much greater advantage.

I admit there is a possibility of error in the casting of teeth. I know that when I cast these teeth from a wax pattern there is still greater chance of error. Dr. Young, when I showed this to him last January, drew my attention to this point, and I then placed my wax patterns back into the original impression—so there is not the same chance of error.

In regard to Dr. Ferris' suggestion, that perhaps a chance of error as great as two millimeters would lead to an obstacle that was greater than one which would occur where a plan had been made on paper: Emphatically I would say that when I place these teeth back into the impression, those contact points are in contact and are touching. You can see they are in contact, and you cannot measure any closer than that actual contact. The possibility of error would be in the recasting of teeth. When they come out of the impression they are still in contact, but I do not believe they are perfect.

I do not believe this plan, or any other, will enable a dentist to bring teeth into an arch so that there is not two millimeters difference in normal occlusion. I do not believe he can carry out the plan so accurately as to bring it down to within two millimeters of being right, by any plan.

A point that I meant to bring out was the use of this model in fractures. I have had a good many fractures, and have found that with a model of this kind I can do all the construction as if it were in the mouth, make my fracture appliance, and cement it in. I find it of great value in fracture cases. It enables us to do any work we wish outside of the mouth.

Election of Officers.

The society then held a business session at which various committees reported, and officers for the ensuing year were elected. The election resulted as follows:

President—Dr. F. T. Murlless, Jr., Hartford, Conn.

Vice-president—Dr. A. Leroy Johnson, Springfield, Mass.

Secretary—Dr. E. Santley Butler, New York City.

Treasurer—Dr. Martin Tracy, New York City.

Adjourned until the evening session.

Monday—*Evening Session.*

The evening was devoted to a banquet to the members and guests of the society. Following the banquet Dr. N. W. Janney, New York, gave a lecture entitled "An Experimental and Clinical

Study of the Isolated Thyroid Hormone."

[This paper will be published in a later issue of the DENTAL COSMOS.—ED.]

The society then adjourned until Tuesday morning.

TUESDAY—*Morning Session.*

The meeting was called to order by President Ferris at 10 o'clock.

Dr. F. L. STANTON, New York City, read a paper entitled "Movement of Teeth Predetermined by Engineering Instruments: Appliances Designed in Accordance with Analytical Mechanics."

[This paper is printed in full at page 39 of the present issue of the DENTAL COSMOS.]

DISCUSSION.

Dr. J. Lowe Young, New York City. Dr. Stanton, in these cases that are sent to you from men out of town, or by the general practitioner—let us say he sends you a set of plaster casts—do you make the tooth measurements from those in the beginning?

Another question is, Have you seen cases that have been treated by men in this way that were not anything like as satisfactory as these you have shown, but turned out disastrously to the patient?

The point I have in mind is this: I am not a Christian scientist, and I do not believe very much in absent treatment, because my experience has led me to the conclusion that there are no two cases that respond to treatment exactly alike. No man can conscientiously say that the result shown here this morning on these casts is not marvelous for a man who has had no experience, but I would be fearful of such a man meeting a case that did not respond, as I fear the patient would come to grief by the teeth moving faster than the surrounding tissues could accommodate themselves.

Dr. Stanton. I feel that, when I entered orthodontia, even with all the training I could get, I did not serve every patient in the best manner in which he might have been served. The reason I have entered into this consulting work is because this body of specialists cannot even scratch the surface of the amount of work that is necessary to be done. Besides, most of the people who need it cannot afford to pay for the work.

The general practitioner with those books of plans has produced results that would be considered good for a specialist. One man has fifty cases under treatment. I am doing this work honestly, and if I find it is hurting people, I will stop it instantly.

I was about to abandon my profession on account of the unsatisfactory results obtained. I went into this investigation to solve this problem. If after making these arches in my own office, they do not hold a great deal better than they have in the past, I am not only going to quit the practice of my profession, but I am going to leave this society.

In this consulting work we must have an accurate reproduction of the teeth. We require an exact model of the whole case, and also plaster casts taken in small sections. Our tooth measurements are checked in every way. You can rest assured that if any general practitioner sends a case to me, I will not make maps unless I feel the patient will be benefited. Nothing to discredit our profession will be permitted in this consulting work.

Dr. C. A. Hawley, Washington, D. C. In furtherance of Dr. Young's question: You take it from your experience that the difficulties we have experienced in moving teeth are perhaps caused by the fact that the teeth responded differently; the tissues seem to be different? Is that because our appliances have not acted harmoniously in both cases, and that the tissues in all cases would move the same if proper forces were applied?

Dr. Stanton. What I have given you is the predetermination of the occlusal arch. I shall not attempt to answer the biological question as to whether teeth put into occlusion will stay, or why the various failures occur. My endeavor is to give to the general practitioner a method of doing sound orthodontia under proper conditions. I also hope this method will he adopted by dental colleges. You

men will be the ones to judge. If you see bad results from this work in patients' mouths, you should report it to this society, or put it on record.

Dr. Young. Let us say the amounts of tooth material of the upper and lower dental arches are identical. Will that always produce the same results?—I am speaking of the mesial and distal measurements. Take half a dozen arches, we will say. I do not know how much tooth material is in an upper or a lower; but say the same tooth material is in each of the six lower and six upper arches—will that always bring the same form?

Dr. Milo Hellman, New York. According to Dr. Stanton's remarks the main object he seems mostly concerned with is the movement of teeth. Are we being led to understand the word "orthodontia" to mean just the movement of teeth, or have we outgrown this notion through the influence of the progress made in the evolution of our specialty? If our principal aim is to obtain definite results, then we can only judge the act involving the treatment of a case from the beginning to the end, according to the degree of success attained.

I argued similarly two years ago when Dr. Stanton first brought up this subject. I maintained then, as I do now, that the value of his work will be proportionate only to the success of the final results obtained. If Dr. Stanton claims that his methods of treatment are better than those the profession has practiced up to the present day, can he also show that his results are better? What I am concerned with chiefly is the result. If we cannot show any definite result, the energy expended in the movement of teeth is useless and wasteful. It does not interest me to know that a tooth has been moved one way or the other, correctly or incorrectly, if on the removal of the appliances with which it has been moved it still exhibits a tendency to return to its former position. The two cases Dr. Stanton showed might be criticized as still possessing too much "overbite," therefore as far from being complete successes.

I should like to know the percentage and number of cases in which Dr. Stanton has obtained better results than have hitherto been reported, or such results as a good many orthodontists are ready to show at any time. What can he show as final results that will overbalance the past achievements of the profession as a whole?

I demand an answer to my questions because Dr. Stanton, in a series of articles recently published, has attacked the procedures of the entire orthodontic profession. As a member of that profession I consider his accusations undeserved and unjust. Many of us are working just as conscientiously and just as earnestly as Dr. Stanton, and although we are all willing to recognize and give him due credit for such of his achievements as merit it, it is in my estimation not becoming for a member of this society to make statements that may be interpreted as a reflection of discredit on his fellow members.

Dr. F. T. Murlless, Hartford, Conn. I have the keenest appreciation of Dr. Stanton's conception of this method, and the strongest feeling of admiration for the work which he has shown. I have a very clear conception of the amount of ground he has had to cover, and the amount of work that has had to be done to arrive at these conclusions.

Dr. Stanton. I did not bring forward the idea that orthodontists were aiming to establish occlusion. I thought that had been heralded all over the world. When an orthodontist takes a case of malocclusion, no matter how much he knows about paleontology and anthropology, he must select mechanical devices to move the teeth.

It seems unfair to speak of end results in discussing such a paper as I have presented.

We are a body of specialists who believe in normal occlusion of the teeth. We are all agreed that when teeth are in malocclusion they should be moved to occlusion by mechanical devices, until such time as our biological investigations will enable us to prevent malocclusion.

The contention of my paper is that it is possible to predetermine in any case

the relative movements of the teeth to change them from malocclusion to occlusion; also that with the aid of plans appliances may be designed to execute the desired movements. No amount of biological knowledge will offset a faulty diagnosis made by examining plaster models and selecting appliances that violate mechanical laws.

Is there not enough spirit of fair play to rise up against such a criticism of this work? You challenge me for evidence. I have brought evidence. Is it not good?

Dr. A. P. Rogers, Boston, Mass. We are in the profession of orthodontia to obtain the best results for our patients. When a firm or corporation starts in business of any kind, the object usually is to obtain the best results for their stockholders. One of their first efforts in these days is to secure the services of efficiency experts in order to obtain results in a quicker and better way, if possible, than their competitors.

If I were to try to designate the direction of our effort, I should say that it had been up to this day a combination of the artistic and empirical, without overmuch aid from the science of mechanics. We have not until recently called in the expert in mechanical engineering, and we must soon recognize that we are unable to obtain the best results in the quickest way unless we apply the leading principles of mechanical efficiency as taught us by these experts. Irrespective of biological growth, and much else that cannot be defined, we must seek and find the true relation which exists between pure mechanics and physico-mechanics. We know that there must be close relationship, and it is going to be interesting and profitable for us to seek and find it.

The very best thing our society can do is to begin thinking along efficiency lines, and to study and adopt everything which will help us to be more efficient orthodontists, to the end that we can give our patients more effectual treatment.

Dr. A. L. Johnson, Springfield, Mass. I wish to ask Dr. Stanton if his arch form depends entirely upon the form and size of the first permanent molars.

Dr. Stanton. The arch form depends on the size and form of every tooth in the arch. You cannot separate them.

Dr. Johnson. You start with the first molars?

Dr. Stanton. You must start somewhere.

Dr. Johnson. How did you answer Dr. Young a few minutes ago?

Dr. Young. My question was, If the mesial diameter of the thirty-two teeth was identical in half a dozen cases, would the arch form be identical? Dr. Stanton replied, No, because it would depend on the measurements of the tooth in every direction and dimension—not only the mesio-distal diameter, but the buccolingual diameter, and every other.

Dr. Stanton. If you would permit me, I should like to read before the society a paper on the vertical curvature and the treatment of the overbite. I have asked this society, as a test, to select three skulls with normal occlusion and widely varying arch forms, to see how nearly the occlusograph can predetermine occlusion.

Dr. Young. That is the proposition you made once before, about the determination of the arch from the skulls. You said that you must make the measurements of the teeth.

Dr. Stanton. You may sit by us, as we measure the teeth; no human being can say what form that instrument will take. You will see us drop in link after link, and when that crooked thing is straightened out, we will show the occlusal arch. We must take the teeth and measure them, and fit the molars together.

Dr. Young. Supposing we handed you these teeth in sections.

Dr. Stanton. You can hand us the teeth one by one, and take them back as they are measured.

Dr. H. E. Kelsey, Baltimore, Md. You mean that we are to bring the thirty-two teeth from a skull, and you will predetermine the arch?

Dr. Stanton. A dentist said he would like to see this test made. He handed us thirty-two teeth, saying it was one of the most beautiful sets of teeth he had ever seen. We put it on the occlusograph,

and no arch could be predetermined unless you extracted one of the teeth. There was a discrepancy in the tooth material. We tried the arches with various overbites, changing the arch form, but no arch could be formed without the removal of one of the teeth. We therefore formed an arch with three lower incisors and those teeth are being set up by an expert in anatomical articulation. He will set the molar teeth first, and when he gets around to the incisor region those three incisors will exactly fill the gap. We gave him the exact arch width, and he will have exactly the amount of space to put in three lower incisors. A report of that case will be published shortly.

Dr. Murlless. Do I understand that these teeth have been considered in perfect occlusion by the man who brought them to you?

Dr. Stanton. No, we gathered that; he did not say so.

The President. Why there should be any rancor or question about Dr. Stanton's sincerity I do not know, and I think that should be eliminated. I would entertain a motion that a committee be appointed to look into this matter. It only seems fair that any one of us who develops a thing worthy of consideration should have fair treatment.

Dr. Murlless. This matter in regard to the skulls is one in which we must all have misunderstood Dr. Stanton. Such being the case, I think the question really rests with him. He has reached the point where we can see what he is working for, notwithstanding the reluctance of some of us to accept this method *in toto,* and without evidence that exists only in his mind. Whether Dr. Stanton would like us to give him a final indorsement or not is largely his pleasure.

Dr. Stanton. I do not want any final indorsement, but I would like a test.

Dr. Hawley. I cannot see any need for an official test. If he is going to help us, let us receive it, and make all we can of it; but I cannot see that an official indorsement of a committee of three individuals will amount to much.

Dr. Young. As I saw the slides on the screen this morning, every arch that Dr. Stanton showed seemed to me to be what I would say excessively wide in the cuspid region. I am not prepared to say it is not right, because I do not know; but if I treated my patients in that way, and gave them that kind of dental arches, I think I would have a great deal of dissatisfaction.

The second point is what he said about the determination of the overbite. I have come to the conclusion that the determination of the proper amount of overbite in the incisal region is the most difficult problem in all orthodontia, and I am firmly convinced that orthodontic treatment should be completed by the time the bicuspid and cuspid are in position; I cannot see how it can be determined before, unless some sort of radiograph is used. If Dr. Stanton can show us the amount of normal overbite in the incisal region, then I say he is a wizard.

Dr. Kelsey. I accepted Dr. Stanton's proposal and sent him a pair of models. I am endeavoring with appliances to produce exactly the arch forms indicated by the survey chart sent me. In the few months it has been under way, it has progressed very satisfactorily, but I have not yet reached the completion of the case. I only mention this because I think the time has come when anyone can test it out for himself, and perhaps that is one of the best ways of getting at the true value of the procedure.

The President. I have heard Dr. Stanton say that he would survey for charitable institutions. I do not know whether he would consider this organization as a charitable institution, but if he would open his doors to us, and extend an invitation to the men to have an individual trial, I think probably it would go far to satisfy the minds of the men as to the efficiency of his plan of procedure.

Dr. Stanton. I should be very glad to do that, although I can hardly say I consider this institution a charitable one!

A vote of thanks was tendered to Dr. Stanton for his presentation.

The President next introduced Dr. FLOYD S. MUCKEY, New York City, who gave a lecture and demonstration on "Phonation."

The next item on the program was the reading of a paper by Prof. WILLIAM KING GREGORY, New York City, on "The Evolution of the Human Face."

[This paper will be published in an early issue of the DENTAL COSMOS.—ED.]

The society then adjourned.

(To be continued.)

Dental Society of the State of New York.

Forty-ninth Annual Convention, held at Rochester, N. Y., May 10 to 12, 1917.

(Continued from vol. lix, page 1258.)

FRIDAY—*Evening Session.*

An informal banquet was held at the Powers Hotel, on Friday evening, at 7 o'clock. There was a large attendance, and a most enjoyable entertainment was provided. Dr. H. J. Burkhart acted as toastmaster.

Dr. BURKHART. I wish to express, on behalf of the committee in charge, their very great pleasure and gratification in seeing so many present tonight. It is a most unusual thing for a State Society banquet to have over two hundred in attendance, and this marks a new era in State Society affairs.

I hope the dinner will be one of the functions at each annual meeting, in order to give the members an opportunity to get together, not for the purpose of listening to ten or fifteen toasts, but to listen to the two or three speakers specially selected for the occasion, and for another purpose which will be most pleasing to you. I want to personally congratulate the Local Committee on the splendid work they have been doing at this meeting, and I think you all have your hats off to the chairman of the Exhibit Committee, Dr. Link.

I take very great pleasure in presenting to you a gentleman who really does not need to be presented, because he has the right to present himself—our friend from Buffalo, the president of the New York State Dental Society, Dr. Murray.

PRESENTATION OF FELLOWSHIP MEDAL.

Dr. Murray, on behalf of the society, in presenting the Fellowship Medal to Dr. James R. Callahan, Cincinnati, Ohio, spoke as follows:

Dr. MURRAY. *Dr. Callahan,*—One of the important and delightful functions of our State Society meetings, made possible by one of our most highly esteemed and beloved members, Dr. Jarvie, is the ceremony of electing Fellows of the Dental Society of the State of New York.

Section 26 of the By-laws provides that—

> The Committee on Nomination of Fellows shall, at each annual meeting, recommend to the Council the name of a dentist who, in their judgment, has contributed results of original research, or of one whose high attainments and high standing have been of such character as to have materially aided and advanced the science and art of dentistry.
>
> Those recommended must be natives or residents of the United States or Canada. They shall be elected Fellows of the Dental Society of the State of New York in the same manner as is provided for the election of honorary members, and shall be awarded a gold medal of design and inscription approved by the society, which shall be paid for from the interest

of the Wm. Jarvie Fellowship Gold Medal Fund.

By the authority vested in it by the by-law just read, this society has been signally honored in the past by being permitted in this impressive and tangible manner to honor some of the greatest scientists, some of the noblest and most lovable characters, in the dental profession on this continent.

To be permitted to have one's name enrolled as a Fellow of this society may not mean much to a man whose soul is aflame with devotion to his profession and whose time is fully occupied with the arduous and exacting duties of professional life; but to be permitted to have one's name added to the roster that bears the names of Black, Brophy, Darby, Jarvie, Miller, Talbot, Cryer, Jenkins, Andrews, Perry, Truman, Carr, Johnson, and Jackson is a distinguished honor devoutly to be desired, and an ample reward for a lifetime spent in the service of dentistry and humanity.

In selecting you, Dr. Callahan, as the 1917 candidate to receive this special mark of our esteem and love, the Committee on Nomination of Fellows had in mind your valuable services to dental science, and the self-sacrificing manner in which you have labored toward the solution of some of the most perplexing problems of our profession.

Your efforts toward the standardization of root-canal technique have placed your name high up on the roll of honor among scientific investigators, and have won for you well-merited praise and recognition by organized dentistry throughout the world.

Of your past life, history informs us that you received a high-school education in Hillsboro, Ohio, a country town of 3000 inhabitants, near Cincinnati.

Being the son of an old-fashioned family physician with office and residence combined, you had ample opportunity to develop latent talent, which pastime took the form of rolling blue-mass pills, putting up quinin powders, reading medicine, and assisting in the surgical work that came to the office. It was here also you received your first instructions in sterilization, where hands and instruments were usually sterilized in the same basin or bucket or whatever was most convenient.

After being graduated from the Philadelphia Dental College in the class of 1876–77, and working in an office in San Francisco for about three years, you located in your home town, and in 1889 moved to Cincinnati, where during the early years of practice you took special courses in the medical college. On account of your deep interest in matters pertaining to your profession you were called upon and served your state and local societies in official capacities for more than twenty-five years. Your first important contribution to dental literature that commanded attention was a paper read before the Ohio State Dental Society in December 1893, entitled "Sulfuric Acid for the Opening of Root-canals." This paper, with slight modifications, was read before the New Jersey State Society in 1894.

About this time your researches on tin and gold in definite proportions for filling a certain class of cavities attracted attention.

Your more recent contributions to dental literature were papers entitled "Rosin as an Adjuvant in Root-canal Filling," read in New York City in 1914, "Root-canal Preparations," read in Brooklyn and Boston in 1915, and "Branching of Pulp-canals and Multiple Foramina," read before the National Dental Association at a later date.

These valuable additions to dental literature were the cause of your selection to fill more honorable and arduous positions relative to the prosecution of scientific investigations in the field of dentistry, hence your appointment to membership on the medical staff of the Cincinnati General Hospital as director of the dental clinic; and, as a mark of esteem and confidence of the National Dental Association, you were made a director of dental research on "Root-canal Problems" under the auspices of the National Dental Research Institute.

The character of a man is often

judged by the company he keeps, and there is no better company than good books, and in this connection it is not surprising to learn that you have in your possession one of the most complete privately owned dental libraries in the United States.

It is said that every man has a hobby. This has the effect of not only maintaining a well-balanced mental equilibrium, but in your case furnished a profitable diversion from the exacting duties of professional life. We are credibly informed that your particular hobby is chicken-raising, in the prosecution of which you have accumulated some interesting data on this subject.

The best means of determining a man's worth is the esteem in which he is held by those with whom he associates, and it is not surprising to learn that Dr. J. R. Callahan is a great favorite not only in his home city but throughout the entire continent.

This society congratulates you on the honor and distinction that has come to you in your efforts to serve humanity, and I esteem it a peculiar privilege and pleasure on behalf of organized dentistry in this state to present to you the Wm. Jarvie Gold Medal, and proclaim you a Fellow of the Dental Society of the State of New York, and we as a society greatly appreciate the opportunity this occasion affords of expressing to you in this manner our love and esteem for the great service you have rendered the profession of dentistry and to suffering humanity.

Dr. Callahan, in accepting the medal, said:

It affords me a great deal of pleasure to announce to you that I have been informed that I am expected to make about a three-minute speech, because of the very full program for the evening. Not only should the speech be brief, but possibly it should be of the character that was indicated by a letter I received a short time ago from a Northwestern society, inviting me to come to their state meeting to read a paper, and saying they would pay my railroad fare and hotel bill. It was signed by the chairman of the executive committee, and it had as a postscript the following: "We would expect the paper to be worth the money it costs us." I replied on that occasion that I did not think I had anything that was worth the money, and I did not go.

On this occasion perhaps I should have said I had nothing that was worth the expense, but still I came.

The endowment of the Jarvie Fellowship I suppose was for the purpose of encouraging study on the part of the dentists, in order that we might better understand some of the problems that confront us. In my early life, when I first began to study dentistry, I received my first encouragement from a member of this society. It was before the old Mississippi Valley Association that I read a paper—my first paper. Jonathan Taft was present, and William H. Atkinson, and perhaps my friend Dr. Hoff, who is with us tonight. I think Dr. Hoff was just about able to walk alone at that time. Being my first attempt, and being quite a young boy, when I sat down I was in a perspiration, and I wished the floor would open up and swallow me. Dr. Atkinson came and sat near me, and put his hand on my shoulder, and said, "My dear boy, you are doing very well. Go on and study and work. Make the effort, and some day you will be able to write a good paper." [Laughter.]

Now Dr. Atkinson's society, the New York State Dental Society, has called me up and has said, "You are doing very well; keep it up."

If I do not appear to place proper estimate or value upon what has occurred in the last few moments, it is simply because I have not the words that are adequate to express my feelings, but I assure you I appreciate it very deeply. I feel that a greater honor has been conferred upon me than I ever dared to hope for. I thank you from the bottom of my heart, and I promise you I will endeavor to keep up the work as best I can.

Dr. Burkhart. I have the great pleasure of breaking a little news to you,

and of introducing the president of this society for the coming year, in the person of the president-elect of the Dental Society of the State of New York—Dr. Amos C. Rich of Saratoga Springs.

Dr. Rich. *Mr. Chairman, brother members, and friends,*—I appreciate this high honor more than I can say. My feelings are beyond what I could express to you. I hope I may be able to fill this office to the expectations of the members of this society, but to do that, I ask each and every one of you, and those who are not present tonight, to help me; and in turn I promise you to do the best that is within me. I thank you very much.

Dr. Burkhart. We would like to have a word from an old friend who has honored us with his presence tonight. He has been a guest of the Dental Society of the State of New York for many years.

I take great pleasure in asking my good friend Dr. Gaylord to address you.

Dr. E. S. Gaylord, New Haven, Conn. *Mr. Toastmaster and gentlemen,*—It is quite a surprise to me to be called upon; but if ever I felt I would like to be able to make a speech, it is just at this moment. To be asked to be present at such a gathering as this is indeed a privilege that is well worth living for. To be able to attend for many years, as I have, your state meetings is always a privilege; to me it seems a duty, and I have often said I cannot afford to stay away.

It is a great satisfaction to be able to say even a word before such an audience as this. I knew before I came here that a good program would be presented. It is to be greatly regretted that that program has been interrupted, but the method of its interruption we all indorse for the sake of our dearly beloved country.

Now to digress a bit. I am known as the famous beggar of the National Association Relief Fund. I represent that committee, and I shall say just a word relative to that, because it is one of the things nearest to my heart. I want to live long enough to see $50,000 in the treasury, and then we will begin to aid the poor fellows who are suffering. Nearly half that sum is already in bank. The great work of the last year on your part has stimulated your committee to make efforts beyond former years, and if we all keep up in the manner we are doing—I hope this great calamity which has come over us will not interfere with it—one year more will complete that sum of $50,000.

I also want to extend to you our thanks in aiding us so nobly in purchasing the Christmas seals.

The society then adjourned.

Saturday—*Morning Session.*

The meeting was called to order by the president, Dr. Murray, at 11 a.m.

The President. We have about arrived at the end of our program, and it may with truth be said that we are about to consider one of the most important—if not the most important item on our program—the paper by one of our own members, Dr. John R. Callahan of Cincinnati, Ohio, who will speak to us on the subject of "Logical Asepsis in Dental Practice."

[This paper is printed in full at page 31 of the present issue of the Dental Cosmos.]

DISCUSSION.

Dr. A. R. Cooke, Syracuse. It is undoubtedly true that our dental offices, as offices, are poorly arranged for the purpose. We have too many hangings, too many oriental rugs, too many domestic rugs, too many dust-catchers, too many dirty corners, too much rubbish lying around, and we are not careful enough in other ways. The only way of correcting my own errors would be to throw all the equipment I have in the scrap-heap, rent a new office, and begin at the foundation, for I want an office that can be cleaned. I want an office which I am not dependent upon the janitor of the block to come in and clean for me.

We have gone at the question of sterilization in a very haphazard way. We

have been buying a lot of nice expensive white-enamel furniture, and putting that up to catch the eye, to please the public, and lead them to think that we are being aseptic in our operations. Now, we are not aseptic in any sense of the word. I know I am not, and cannot be until I have a different office. There are many things we cannot do in our offices which the essayist has shown us ought to be done.

The matter of the sterilization of every instrument used for a patient before it is used for another case is absolutely essential, and can be practiced by anyone. Better care of the hands and of the materials we use is necessary. The essayist has shown that the ordinary paper points, while they may be sterile when made, are not sterile when we get them. We may sterilize our instruments in the sterilizer, and believe that they are sterile when they are taken from the apparatus. We bring them into the operating-room, put them in a case, the dust settles on them, and we no longer have sterile instruments. We may or we may not have pathogenic germs; we probably have many inoffensive ones.

I had hoped the essayist would tell us how to efficiently and properly sterilize such instruments as handpieces, which cannot be taken apart, in which the mechanism necessitates having a quantity of oil, and which we would like to have as clean as anything else.

In the matter of the care of the hands, I shall have to go home and get Dakin's solution, new brushes, new soap, and spend a great deal more time in scraping off these prehensile attachments of mine. I shall endeavor to find out what particular class of bacteria I carry around on my right thumb and index finger. We know what Dr. Callahan's brand is—he has told us.

While it is not possible for us to do all we ought, we certainly can do better than we have in the past, and if we are to get the results desired and are going to be safe and sane in regard to our patients, we must pay more attention to these things. I venture to say there are hundreds of offices in the State of New York which have absolutely no means of sterilizing instruments, not even an old rusty pan, and yet we wonder why we have so much dirty dentistry. It is no wonder to me that we have periapical disturbances and many systemic effects.

I do not know how many infections my patients have carried home, but, fortunately for me, they cannot prove that they got them in my office.

Let us go home and reorganize; throw out the old rubbish and get some new sterilizers. Let us be more careful about our instruments, and be honest about it. If we do that, the law will hold us blameless.

I wish to thank Dr. Callahan for coming here and giving us this talk. I think it is particularly profitable at this time.

Dr. Charles F. Ash, New York. I feel sufficiently interested in this subject to want to take up a minute or two of your time, because of some points Dr. Callahan brought out, and because of some points Dr. Cooke brought out in the discussion. I think Dr. Cooke struck the keynote of the whole situation when he said, Be honest; that means, be honest with yourself and your patients. He struck another very good note when he said the thing to do is to go home and discard the old equipment and get a new one, and if necessary get a new office. I suppose not every dentist has enough ready money to discard everything and get all new equipment, but if it is possible to discard such of it as is not adequate, and put in some that is adequate, you will find that the money has been spent to good advantage. The lovely white enamel furniture has been catching the patient's eye, and possibly we have told the patients we had it because we did not want to cause infection—that it was sterile. We have been impressing upon people the fact that it is possible for them to get infections from such sources, and now the patients are going to catch the dentist. They are waking up to the possibility of infection in our offices, and will demand that sterilization and the antiseptic methods necessary to

protect them shall be followed out, and it will not be simply that the furniture be painted white.

A word about hand-brushes. If you have not used it, I would recommend a solution of potassium bichromate for keeping the hand-brush antiseptic. After you have used the brush, it should be washed out, put in the sterilizer and boiled, and when it is taken out of the sterilizer it should be placed in a glass container filled with potassium bichromate. After the container is thoroughly cleaned and filled with boiled water taken from the sterilizer, then put in just enough bichromate to give the water a deep orange color. It is not necessary to measure the exact percentage, because a little more than is necessary does no harm. I prefer that to lysol. It is a good antiseptic, and is not harsh on the hands. It is a good deal cheaper, too, costing about ten cents for four ounces. It is very comfortable to use on the hands, and does not leave any disagreeable odor. Brushes kept in this solution will remain sterile until you are ready to use them. With regard to handpieces, we put our handpieces right in the autoclave and sterilize them.

As to flowing steam, the objection I have to that is that it takes longer to sterilize anything with flowing steam than it does when put in the autoclave and sterilized under pressure.

Dr. Cooke. Will your handpiece stand the heat of the autoclave?

Dr. Ash. Yes. We usually wipe off the handpiece with alcohol, wrap it in gauze and put it in the autoclave. We use for waste receivers the paper containers made by Johnson & Johnson. Paper points, gutta-percha points, cotton, small napkins to be used for various purposes, and all such things, are put in the autoclave and sterilized. All instruments are put into boiling water and sterilized.

When I am ready to do root-canal work, I announce the fact to my nurse, and proceed to sterilize my hands. The cover from the jar that contains the brushes is removed, we start the water running, and use the brushes with a mixture of green soap—we use the kind that is used in the hospitals; my nurse makes it gallons at a time, and we find it efficient and not expensive.

While I am scrubbing my hands with the brushes from the jar, green soap, and hot water, the nurse produces a package done up in an antiseptic towel, and lays it on the operating table. That towel is wrapped in an outside container, which is discarded when the aseptic towel is ready to be used. The instruments are taken from the sterilizer directly with a pair of aseptic forceps and placed on the towel.

The nurse has another package which contains the napkin that I dry my hands on, and also we have rubber gloves ready in case we want to use them throughout the operation. The rubber dam has already been applied, and we have gone through the usual sterilizing procedure that you are all familiar with.

Many times I have seen a man spoil his whole operation by going into a root and then putting that instrument with other instruments that are sterile. If you use an instrument in a root-canal once, and put it with other instruments, you spoil those instruments. I put everything into a tray, and everything that goes into that tray is sterile until it is used.

I know it is hard to get out of the old ruts, but it is our duty to our patients to do so.

Dr. F. W. Low, Buffalo. I understand, Dr. Callahan, that we have to be particular when we are doing root-canal work. Would you consider it necessary to take all those steps in view of the mishaps that occur in the dentist's office —I mean an ordinarily clean man—in doing work other than the treatment of root-canals?

Dr. Callahan. If I understand your question, I believe we should follow these aseptic precautions in everything we do. I will cite a case: A patient was sent into our ward in the hospital with an infected mouth, which had been infected in extracting a third molar. The patient was in a very serious condition. A suit was threatened. If it could be

shown that that dentist was not in the habit of following these lines of asepsis, that would settle the case.

Dr. Low. One of your slides showed the presence of different varieties of organisms. If the bacteria were dead, so they would not make a culture, what then?

Dr. Callahan. The smear from which the picture was made was taken from a culture. We did not obtain a pure culture from this case on account of an error in the technical work. The case was then thrown into the discard.

Dr. Low. Did you ever get a culture on taking out a root-filling that you considered perfect, to see if there were any possibility of infection there, after it was made by the most perfect filling method you knew of?

Dr. Callahan. No; that would be a valuable test in several ways.

Dr. Low. If we do not do that, we have not proved anything, in my estimation.

Dr. Callahan. The question of sterilizing the handpiece was mentioned. The method Dr. Ash spoke of is of course very effective. If you add a little bit of green soap to the water, and boil that, you can sterilize the handpiece. In some cities they have endeavored to pass a law that the barber shops should be examined and given certificates to the effect that they are using aseptic methods in their work; and in two places I know of the dentists were included.

Dr. Ash brought out the point that every instrument that has been used on an infected area should not be used again; it should be dropped into a glass dish. If the instrument were lying on the table I should be sure to take it up again, but it is the duty of the nurse to get it out of the way after I have used it.

Dr. Louis Meisburger, Buffalo. Would you consider it safe to have on your operating stand an evaporating dish with water in it at 90° C., in which to put the instruments? If you put them in this for three minutes, would you consider it safe to use them again?

Dr. Callahan. I would rather do it the other way.

Dr. Meisburger. You must give us something practical. I am afraid you are getting a little too pessimistic, and if I had not listened to Dr. Ottolengui yesterday, I would lose all hope. We must do something to improve our technique, but we must give the average man something he can use, and not simply to listen to at dental meetings.

Dr. Callahan. I do not think I have advocated anything that is impossible. It is your habits that you are afraid of.

Dr. Low. Besides the root-canal, you said we should take the same precautions with other work. If my hands and instruments are absolutely sterile, and I have gone into a bicuspid to excavate the dentin, if I take out one chip of the dentin must I put that instrument into the sterilizer again, or would I contaminate the cavity?

Dr. Callahan. You might get a different infection, because there are different kinds of micro-organisms at various depths.

Dr. Low. It simply shows that the question is one of absolute impossibility.

Dr. Callahan. My idea is to create the habit of thorough asepsis as nearly as I can. A lot of the work which you take for granted, because I have gone into the detail here, does not mean that I have advocated any extreme. I have advised you to buy the cheapest sterilizer that is made, and I have advised you to do the things that are protective to your patient. It is astonishing how they notice those things. Nearly every man, woman, or child of the educated classes understands what asepsis is. I want to cultivate the habit. I have had to correct myself very often, and still do so. If I lay an instrument down, I am sure to take it up again, and I have to be watched. My nurse watches me very carefully.

Dr. F. A. Ballachy, Buffalo. When you have laid down a broach which comes out infected, will close proximity contaminate other instruments, or must they be in contact with the infected broach? You stated, I think, that the whole surrounding area could be contaminated. Will it be by the air, or by contact?

Dr. Callahan. It would be difficult to answer that question definitely. We have two glass dishes in the cabinet, one for things discarded, and one for the things to be sterilized. The nurse removes these dishes after each patient.

Dr. Ballachy. Could the instrument stay in the dish until the end of the operation without contaminating your other instruments three or four feet away?

Dr. Callahan. I think so. On the bottom of each dish is a little water to which a few drops of formalin has been added. Be as clean as you know how, and keep it up.

THE PRESIDENT. We now come to a very important matter, the purchase of a dental ambulance to be presented to the Government of the United States by the dentists of this state. It is a contribution in support of your government, and I want all who desire to contribute, who have not already done so, to give their names to the men who will pass up the aisles.

The report of the secretary of the Executive Council was then read. On motion, the report was received and adopted.

The next order of business was the installation of the newly-elected president, Drs. Messerschmitt and Meisburger escorting the president-elect to the rostrum.

DR. MURRAY. Dr. Rich, it gives me great pleasure to welcome you to the chair, and I hope the coming year will be one of as intense interest and profit to you as the past year has been to me. In taking up the official duties, I did so with considerable misgivings. I did not have very much experience in wielding the gavel in such important organizations, but as the work of organization proceeded, and the interest among the various members became manifest, I began to feel at ease, and the very able manner in which the members of the profession throughout the state have risen to the occasion has indeed been a gratifying experience to me. I sincerely hope and trust that the support that was so freely accorded me will be accorded to my worthy successor.

I now hand you the gavel of authority, and wish you every success in the coming year.

DR. RICH. Gentlemen, I am not a speechmaker. I shall attempt to do my duty as a presiding officer, but beyond that, I shall be very quiet.

The society then adjourned until the next annual meeting.

THE DENTAL COSMOS

A MONTHLY RECORD OF DENTAL SCIENCE.

Devoted to the Interests of the Profession.

EDWARD C. KIRK, D.D.S., Sc.D., LL.D., *Editor.*
L. PIERCE ANTHONY, D.D.S., *Associate Editor.*

PUBLISHED BY THE S. S. WHITE DENTAL MFG. CO., PHILADELPHIA, PA.

SUBSCRIPTION PRICE, including postage, $1.00 a year to all parts of the United States, Hawaiian Islands, the Philippines, Guam, Porto Rico, Virgin Islands, Cuba, and Mexico. Canada, $1.40. To other foreign countries, $1.75 a year.

Original contributions, society reports, and other correspondence intended for publication should be addressed to the EDITOR, Lock Box 1615, Philadelphia, Pa.

Subscriptions and communications relating to advertisements should be addressed to the BUSINESS MANAGER of the DENTAL COSMOS, Lock Box 1615, Philadelphia, Pa.

PHILADELPHIA, JANUARY 1918.

EDITORIAL DEPARTMENT

A Professional Appeal.

SOMEWHAT over a year ago we asked our wide circle of readers to give sympathetic consideration to an appeal for funds made by "l'Aide Confraternelle," a benevolent organization of our professional *confrères* of France the objects of which have a valid claim to our sympathy and support. We regret to say that the appeal brought but a meager response. We again direct attention to this charity, in the hope that a clearer understanding of the matter may bring out a more worthy practical expression of the spirit of fraternal helpfulness which dentistry has always shown in any time of stress or calamity affecting the *personnel* of its professional body.

Throughout Belgium and the whole area of French territory devastated by the war, practitioners of dentistry, in common with the rest of the population, have had in most instances their every

earthly possession swept away. Homeless, dependent families of dentists whose male heads have been mobilized or killed, dentists in civil life dispossessed of means of livelihood and now in dire need, are among those for whom the appeal for help is made by l'Aide Confraternelle, which is undertaking the investigation of all appeals of a dental professional origin and is wisely and economically distributing the collected funds in relation thereto. Nor is its larger objective concerned wholly with the alleviation of suffering among dentists and their families during the active war period. By its charter from the French government the organization is to be continued for a period of five years after the conclusion of peace, in order—

> (1) To facilitate the return to normal life of all colleagues severely injured by the war, by giving to them or advancing as an honorable debt the necessary means to re-establish themselves; and
>
> (2) In the invaded districts to help in the reconstruction of destroyed homes and in newly equipping dental offices devastated by the enemy, so as to enable dentists to resume their practice.

The officers and management of the organization are representative of the leading dentists of France, with a committee of patrons comprising the most distinguished leaders of the dental profession in that country, who together are chartered as an organization in conformity with the French law. The *personnel* of l'Aide Confraternelle in itself is ample guarantee of the strength of that body, and of the wisdom, philanthropic spirit, and economy with which its benefactions will be dispensed. Founded in March 1915, the association has collected up to the present time *Fr.*64,-968.05, *i.e.* slightly more than $12,500, contributed almost wholly by French dentists; or, measured by the length of time during which the association has been in active operation, there has been collected less than $5000 per year, which, considered in relation to the magnitude and importance of the objective, for which funds are desperately needed, is meager and wholly inadequate.

The dental profession of America is asked to contribute to a fund to aid destitute and distressed colleagues and their families in the war zone of our allies. Two aspects of this matter present themselves for consideration. The first consideration is a personal and intimate one, obviously because the cry for help comes from our brothers in distress. In every local case when the ap-

peal has been made to the dental profession of America the response has been liberal and prompt; that is to say, when we have understood and realized that the need was one within the limits of our own professional household. But we submit that the present one is precisely such a case. The war is now our war; we share its consequences in common with our allies; our professional household has thus been enlarged by the condition of war so as to embrace every colleague of the Entente nations in the membership of our immediate professional family. We repeat that "These colleagues who have lost all are dependent for relief upon the only enduring and saving human sentiment which stands out as a worthy human characteristic in this maelstrom of world-madness—the spirit of brotherly love." We believe that spirit to be keenly alive among all who struggle for the common blessings of equal freedom and justice to all—blessings which none may rightly enjoy without paying for them in terms of whatever available possession he may have, in service or in substance. We appreciate the fact that appeals for aid necessitated by war conditions are multitudinous, and that each is a pressing one; nevertheless, the meeting of these demands is a condition that war imposes, and none may escape the responsibility of doing his share even though that share shall be the final sacrifice—to help attain the goal. In the present case, in which the appeal is not for a general but for a particular need, a request for aid from dentists to their brother dentists, the opportunity thus afforded becomes a duty as well as a privilege. Prompt action, a little self-denial, and a moment's consideration of the immeasurable good that will result from a whole-hearted response by the dental profession of America to this appeal on behalf of our suffering French and Belgian colleagues and those dear to them, should put the required funds at the disposal of l'Aide Confraternelle without delay.

We ask each reader of this appeal to regard it as personally addressed to him. We ask the editors of all dental periodicals to re-voice this appeal in their several publications and to act as receiving stations for contributions, which may be sent direct to the Treasurer of l'Aide Confraternelle, M. Fontanel, 1 Rue Vercingétorix, Paris, France. The Dental Cosmos will acknowledge and will so forward any contributions to the fund sent to its publication office addressed to the Editor.

Bibliographical

The Practitioner's Medical Dictionary. Containing All the Words and Phrases generally used in Medicine and the Allied Sciences, with Their proper Pronunciation, Derivation, and Definition. By George M. Gould, A.M., M.D., Author of "An Illustrated Dictionary of Medicine, Biology, and Allied Sciences," "The Student's Medical Dictionary," "Pocket Medical Dictionary," etc. Third Edition, revised and enlarged. By R. J. E. Scott, M.A., B.C.L., M.C., Fellow of the New York Academy of Medicine, Editor of Hughes' "Practice of Medicine," Gould and Pyle's "Cyclopedia of Medicine and Surgery," etc. Based on recent medical literature. With many Tables. Philadelphia: P. Blakiston's Son & Co. Cloth, $2.75.

While this book is not intended primarily for dentists, it contains much valuable information in a terse and comprehensible form that every dentist should have readily accessible. The definitions of some of the strictly dental terms are not all that could be desired, but are, we believe, on a par with the average medical lexicographer's conception of dental terms.

The eponymic terms have been placed in their proper alphabetical order rather than under the test, process, or disease with which the name is associated, and the compiler has inserted therewith the nationality and the dates of birth and death of those referred to, incidentally affording the reader a very interesting and valuable historical record.

It is noticeable that the author has not entirely accepted the generally adopted method of dropping the final "e" in spelling certain medical and chemical terms, such as cocain, morphin, oxid, chlorid, and the like.

We recommend this book as a ready reference work for the dentist where he only desires briefly stated general information with regard to various diseases, medicines, terms, etc., with which he may be more or less unfamiliar.

Oral Roentgenology. A Roentgen Study of the Anatomy and Pathology of the Oral Cavity. By Kurt H. Thoma, D.M.D., Lecturer on Oral Histology and Pathology and Member of Research Department, Harvard University Dental School; Instructor in Dental Anatomy, Harvard University Medical School; Captain Massachusetts State Guard Hospital Unit; Oral Surgeon Robert Bent Brigham Hospital; Visiting Oral Surgeon, Long Island Hospital; Member of National, State, and Local Dental Societies, and Interstate Association of Anesthetists; Fellow in the American Academy of Dental Science; Associate Fellow of the American Medical Association. With 311 illustrations. Boston, Mass.: Ritter & Co., 1917.

This book, as the title indicates, deals specifically with the use of the Roentgen ray as applied to dental practice, and

while the author is, as might be supposed, enthusiastic in his advocacy of roentgenology as an invaluable diagnostic means in dental practice, he does not overlook the fact that its greatest benefit is as an aid in confirming diagnoses of dental conditions made in other ways.

The author has wisely, we believe, accepted the nomenclature adopted by the American Roentgen Ray Society, along with the terms *radiolucent, radioparent, radiopaque,* and *radiopacity* suggested by Dr. R. Ottolengui, which latter we also believe to be etymologically sound and clearly explicit in their meanings.

There are, however, other terms used by the author, such as "temporary teeth," "wisdom teeth," and "supernumerous teeth," which we believe should be and have largely been eliminated from dental nomenclature.

The author particularly emphasizes the importance to the dental roentgenologist of an intimate knowledge of the internal anatomy of the bony structures of the head and face in order to be able intelligently to interpret roentgenograms, and has incorporated in his book quite a little of the anatomy of the structures under consideration. In this connection he has given a very clear description, supplemented by diagrammatic charts, of the relations of the developing teeth to the other structures during the transitional period from the deciduous to the permanent denture.

The book abounds in well-printed illustrations which aid materially in elucidating the text. The illustrations are reproductions of roentgenographic negatives which show the conditions as the roentgenologist is accustomed to view them in the X-ray film. Illustrations made from positive photographic prints, as is usually the case in illustrating roentgenographic pictures, are frequently misleading unless the observer is trained in their interpretation.

We feel that every dentist who is equipped for roentgenographic work will derive much benefit from the perusal of the pages of this book, and particularly from a close study of the numerous illustrations contained therein.

A Manual of Dental Prosthetics. By George Henry Wilson, D.D.S., Professor of Prosthesis and Metallurgy in the Dental Department of Western Reserve University, Cleveland, Ohio; Special Professor of Prosthesis in the Dental Department of the University of Southern California, Los Angeles, Cal. Third Edition, revised. Illustrated with 439 engravings. Price, $4.50. Philadelphia and New York: Lea & Febiger, 1917.

The third edition of this deservedly popular book on Prosthesis has been fully revised, and will undoubtedly be welcomed by all dentists who practice this branch of dentistry. Dr. Wilson's well-earned position as an authority on matters pertaining to prosthetic dentistry assures an attentive audience to whatever he writes in his special field.

The author has included in the third edition further investigations of the physical properties of plaster of Paris and vulcanite, and it is interesting to note in this connection that he is still firm in his conviction that plaster of Paris is the best material for taking impressions of the mouth for prosthetic work, notwithstanding the increasing number of adherents to the use of modeling compound for this purpose. In summing up his conclusions with regard to impression materials he states very positively his preference for plaster when he

says, "The more difficult the case the more essential is the plaster-of-Paris impression."

The author pays tribute to the work of Greene and Supplee in awakening the profession to the possibilities of impression-taking and stimulating renewed interest in prosthesis.

Description of the Hall method of antagonization, along with a description of the Hall Antagonizor, is given in a clear and concise manner, the author summing up his opinion of this method and instrument by saying, "They are remarkably simple, positive, and efficient," and unhesitatingly indorses the method as one which he believes "destined to revolutionize the mounting of artificial dentures."

Dr. Wilson's book has been brought up to date as a whole, and no student or practitioner who is interested in prosthetic dentistry can afford to be without this latest addition to the literature of the subject.

Review of Current Dental Literature

[*Lyon Médical,* August 1917.]

Mercurial Stomatitis: Its Pathogenesis, Prophylaxis, and Treatment. By M. Favre.

Favre is convinced that the stomatitis which develops under mercurial treatment is identical in every respect with Vincent's ulcero-membranous stomatitis. The mercury merely induces local congestion and irritates the vessels, thereby encouraging the extensive multiplication of Vincent's spirochætes. Any drugs which kill these organisms cure the mercurial stomatitis even when mercury is continued. Arsenic and silver nitrate are the most effectual. The arsenic can be given internally or intravenously or by local application. This method of giving neosalvarsan with the mercury allows the full therapeutic effect of the mercury, while warding off trouble in the mouth. For local treatment silver nitrate is more effectual than arsenic.

The treatment which Favre has found promptly successful in hundreds of cases begins with the mechanical cleansing of the mucosa of the patches and membranes. This is done with cotton-wound toothpicks dipped in 1 per cent. silver nitrate. The ulcerating mucosa is rubbed vigorously and cleansed of all purulent masses and pseudomembranes, working between the teeth, and thus transforming the inflamed mucosa into a red, freely bleeding surface. The mucosa thus prepared is swabbed with a 1:15 or 1:20 solution of silver nitrate, working it into all crevices, and the procedure concludes with the copious application of 1 per cent. methylene blue. The first treatment is always the longest and the hardest to bear. On the following day the appearance of the lesions is much modified, and the functional symptoms have improved. The swabbing is continued once a day, and later at longer intervals. It is soon possible to have the tartar removed from the teeth, and to put the mouth in a good condition. With hygiene of the mouth, gargling with hydrogen dioxid, and brushing the teeth, there is no return of the buccal infection, even though the mercurial treatment is continued unmodified.

[*Journal of Cutaneous Diseases,* Chicago, August 1917.]

Herpes Zoster, a Focal Infection. By Everett S. Lain.

After a study of focal infections from a dermatological standpoint for nearly three years, observing several hundred cases, and

after consultation with and corroboration by other men, the author is quite convinced that focal infection from the mouth and tonsils plays no small part in a certain class of skin diseases. After conscientiously prosecuting this work in quite a number of cases of zoster, and after observing in many cases rapid recovery or improvement after removal of the offending tooth or other foci, Lain is fully convinced that there is a true herpes zoster which has its origin in a specific infection, having a focal point most frequently in pus pockets surrounding or at the apices of one or more teeth.

Although Lain assures the reader that he is conservative and critical in his observations, the brief case histories which accompany this article do not in themselves suffice to prove the contention. They are not even illustrative. If the cases referred to really afford convincing evidence, their histories have been introduced in too abbreviated a form.

[*Journal of the American Medical Association*, October 20, 1917.]

Alcresta Ipecac. Report of the Council on Pharmacy and Chemistry, A. M. A.

This is a brief note contained in the well-known column "Propaganda for Reform." In 1915 Alcresta ipecac tablets (Eli Lilly & Co.) were admitted to "new and non-official remedies." Since that time advertising claims, less modest than the earlier ones, drew the attention of the Council to this preparation. Among this advertising material were statements to the effect that ipecac alkaloids have a demonstrated usefulness in pyorrhea. "Such an unequivocal statement is unwarranted. In spite of the enthusiastic advocacy, in the past, of ipecac alkaloids as a specific in pyorrhea alveolaris, the preponderance of scientific evidence indicates that ipecac is of questionable value in this condition."

On the basis of this and other extravagant claims it will be necessary to omit Alcresta ipecac from "new and non-official remedies."

[*Den Norske Tandlaegeforenings Tidende*, July 1917.]

St. Apollonia and Her Picture in the Nidaros Breviary. By John Wessler.

The earliest picture, so far discovered, of St. Apollonia is reproduced as a frontispiece to Wessler's article. It was discovered by him in London in 1914. This, the oldest known painting of the patron saint of dentistry, is artistically delineated on a sheet of parchment in an old breviary, dating from the end of 1300 A.D. The breviary belonged to a Dominican cloister in Flanders. The picture is framed by the V in Virgo at the beginning of the text, which is in Latin in Gothic script. A translation here follows:

Concerning St. Apollonia, Virgin and Martyr. For us, O Apollonia, pray heartily to the Lord, lest for our sins we be afflicted with sickness in our teeth.

Versiculus. Pray for us, blessed Apollonia, that we be made worthy. *Let us pray.*

Oratio. Eternally omnipotent God, for whose honor blessed Apollonia, virgin and martyr, steadfastly suffered the horrible crushing-out of her teeth, grant Thou as we desire, that we may be made happy in commemoration of her, through whose most pious intercession we were freed from toothache and all imminent evils. Through Christ our Lord. *Amen.*

Another breviary, that of Nidaros, in Norway, printed in 1519, of which three copies are extant, has recently re-awakened interest, in that its title-page—which was missing in all three existing copies—has been found in Griefswald, Germany. In Wessler's opinion there is no doubt that also here we have to do with a representation of St. Apollonia, although the picture which comprises the title-page of the breviary is not accompanied by other evidence than the forceps.

[*Lancet*, London, October 6, 1917.]

A Case of Vincent's Infection Involving Mouth, Eyes, and Penis. By F. B. Bowman.

After a gradual onset of about two weeks' duration, the local lesions and the systemic condition were so bad that the patient had to be admitted to a hospital. There was a severe conjunctivitis, with copious thin discharge and photophobia. The mouth was half open, and the lips covered with angry herpetic-looking ulcers. The gums were reddened, the teeth bathed in pus, pressure on the gums caused severe bleeding. Three days later there was found on the penis a small red ulcer with a membrane over it surrounding the meatus. Smears made from all three areas showed

large numbers of Vincent's spirochætes and fusiform bacilli.

Treatment with the following prescription as a mouthwash, with admonition not to swallow, quickly cleared up the condition:

Vini ipecacuanhæ,		℥ss,
Glycerini,		ʒj,
Liq. arsenicalis,	ad	℥j.

[*Dental Outlook*, New York, May 1917.]

Clinical Methods of Treating Hypersensitive Dentin. By Hermann Prinz.

A necessary prerequisite to any rational method of treating hypersensitive dentin is a consideration of the factors, structures, or conditions which permit of this hypersensitiveness.

The entire question of a nerve supply to the dentin is still *sub judice*. Prinz suggests that if there are nerve fibers in the dentin, they are not of a sensory or motor type, but are trophic in function.

However this question may be decided in the future, for the present Prinz advances a simple adequate explanation of the mechanism of hypersensitivity. The basis of this theory is the practical incompressibility of water. The sequence of events as Prinz pictures them is somewhat as follows:

There is a break in the enamel covering. The thereby exposed fibrillæ of the dentin absorb water from the saliva and swell; then the slightest pressure upon this swollen dentin will be transmitted through the odontoblastic processes to the bodies of the odontoblasts, and these in turn will compress the nerve plexus underlying and encircling the odontoblasts.

The validity of this explanation is supported by the clinical experience that dehydration will remedy hypersensitiveness. The warm-air blast, alcohol, and acetone will dehydrate dentin, but penetrate so short a distance that frequent repetition is necessary. Sharp instruments used with dexterity conduce to minimize the pressure exerted upon the swollen dentin.

The use of agents which anesthetize the tooth by lowering its temperature is unsatisfactory.

Two classes of drugs may be used to overcome the hypersensitivity—caustics and anesthetics. Among the caustics are mercuric chlorid, silver nitrate, zinc chlorid, sodium or potassium hydroxid, and phenol. All these agents act only superficially, and their application must be continually repeated. Consequently, except in slight cases of hypersensitivity, they are rather unsatisfactory.

The condition of analgesia induced by a general anesthetic, *e.g.* nitrous oxid, is not completely satisfactory. So deep an anesthesia that all sensation is inhibited alone meets the requirements of many cases.

Prinz's views upon local anesthesia and the technique of its induction are so well known and so accessible that they need not be given here.

In closing, he emphasizes the danger and needlessness of resorting to copyrighted preparations used for desensitizing purposes. The employment of preparations containing arsenic or formaldehyd is pleasantly satirized.

[*Den Norske Tandlaegeforenings Tidende*, June, July, and September 1917.]

Aneurysms of the Arteries of the Head and Neck. By Holbaek-Hanssen.

This article is written in German, and hence is accessible to a much larger circle of readers than if it had been presented in one of the Scandinavian languages.

To follow this work intelligently throughout it will first of all be necessary to be informed of the author's definitions and classification. A pathological condition of the arterial wall is the essential character of an aneurysm. The pathological process must have affected and altered the intima, media, and adventitia—either one of these layers or all together. Five forms are distinguished, viz:

I. Aneurysma verum diffusum—an extensive widening of the arterial wall. According to the form and structure these genuine aneurysms may be subdivided as (a) Aneurysma fusiforme et A. cylindroides; (b) A. cirsoideum.

II. A. verum circumscriptum s. sacciforme.

III. A. mixtum. In this form one or two of the arterial walls are expanded after separation of the arterial layers from each other. (a) A. mixtum sacciforme; (b) A. dissecans —here the adventitia in a somewhat marked degree is, after a circumscribed perforation of the inner layers, raised up off of them.

IV. Aneurysma spurium s. traumaticum—also known as an arterial hematoma. The

blood escapes, after a wounding of the arterial wall, into the surrounding connective tissue, and here is collected either as (a) A. spurium traumaticum diffusum, or as (b) A. spurium circumscriptum—here the escaped blood is collected into a sac.

V. A. arterio-venosum.

These are the forms to which the author makes recurrent reference. If an aneurysm be manually and instrumentally accessible it is known as an external aneurysm; if in whole or part manually and instrumentally inaccessible it is called an internal aneurysm. Clinically only the two chief forms, A. verum and A. spurium, are of interest. The latter form in most cases is encountered in the external aneurysms, while the true aneurysms practically are met with in all arteries. Clinically, a pulsating tumor, communicating with an artery and filled with arterial blood, fulfils the general concept of an aneurysm. The false aneurysms are encountered more frequently than the true forms; of the latter the *circumscriptum* and *mixtum* predominate. Age, sex, and occupation play a definite rôle in the occurrence of aneurysms. Most of the aneurysms occur between the ages of thirty and forty, and forty and fifty. Their number in males exceeds that in females. However, aneurysms of the arteries of the head and neck, extra- as well as intracranial, occur approximately in both sexes with equal frequency. These lesions are found generally in the working classes, particularly in men with hard and long bodily labor.

Although the genuine extracranial aneurysms play a very small rôle in comparison with that of the intracranial forms, still for the dentist the latter type is relatively of less interest.

Microscopically the media is found to have undergone the greatest change in cases of aneurysmal alterations of the vessel wall. The at present dominant view is that a mesarteritis and an endarteritis are the most important factors in the etiology of the true aneurysms. Holbaek-Hanssen mentions syphilis, arterio-sclerosis, and joint rheumatism as among the causes of this inflammatory change in the vessel wall. Apropos of the etiology of the aneurysms of the arteries of the head and neck, it may be said that the anatomical relations and the intra-arterial blood pressure work together with (1) syphilis for the intracranial forms in general, although here arterio-sclerosis may be a factor; (2) arterio-sclerosis for the extracranial forms, particularly for the carotis communis and its branches in the arteries of medium size, *e.g* carotis interna. The author was unable to find in the literature a case where an aneurysm of the carotis communis was associated with syphilis.

In this connection may also be mentioned (a) aneurysms which are conditioned by mere increase of the intra-arterial blood pressure, the anatomical relations, and the physiological functionings; (b) the embolic-mycotic erosion aneurysms—which are very rare in the region of the head and neck, although the literature records an aneurysm of the internal carotid following a dental abscess.

There are two classes of symptoms from intracranial aneurysms—(1) those which arise from a direct action of the aneurysm on the brain substance, and (2) those which are seen when the several cranial nerves are exposed to the pressure of the aneurysm. Among these symptoms the trigeminal nerve may be affected, with consequent severe pains in the orbit and attacks of facial neuralgia. (*Cf.* Shannon, 1917: Case of an aneurysm of internal carotid, intracranial portion, and its effect on patient's vision, *Arch. of Ophthalmology*, New Rochelle, Nov., p. 518.) Facial paralyses have been observed, especially after ruptures of the aneurysm. At times a facial edema rapidly follows the development of an aneurysm of the common carotid.

Obviously the diagnosis of external aneurysms is essentially easier than in the case of the internal forms. An aneurysm at the middle third of the internal carotid, and also one of the external carotid, by displacement of the posterior belly of the digastric may condition a swelling immediately behind the angle of the mandible. A certain sign of aneurysm of the internal carotid is said to be a systolic rustling in the region of the parotid.

Aneurysms of the external maxillary artery are great rarities. On the external arteries of the head and neck aneurysms are often formed; but they naturally are rarities and are in most cases purely traumatic injuries of the vessel walls, with consequent formation of an aneurysm or arterial hematoma. Among the head and neck arteries, which border on the oral and pharyngeal cavities, aneurysmal

formations in the internal maxillary artery have been found. The diagnosis is not easy. Generally these are of traumatic origin.

In respect to extracranial aneurysms the symptomatology is more distinct and capable of differentiation than in intracranial aneurysms. In particular, aneurysms which are in the region of the oral cavity or pharynx are readily confused with tonsillar and retropharyngeal abscesses. In all cases an exact examination and a thorough history of the condition have great influence in securing correct interpretation. When it is desirable to decide whether an aneurysm is localized on the internal or external carotid, the temporal artery on each side is observed. If there be no difference in the rhythm of the pulse it is probable that an aneurysm of the external carotid can be excluded.

Aneurysms which have been conditioned by gunshot wounds are relatively rare on the cervical arteries. When the frequency of the wounds of the head and neck seen in the present war are considered, it must be admitted that the aneurysms in question are relatively rare. In part this is to be explained by the fact that wounds seriously involving these arteries bring death before help can come. In part the elasticity of these arteries and their possibility of being shoved aside by the missile account for the infrequency of traumatic aneurysms. Likewise aneurysms which have been caused by stabbing and cutting instruments are rare, because the wounds leading to the outside from these arteries are so large that there is no opportunity for thrombosis and sac formation. It is also peculiarly noteworthy that aneurysms after wounds to the bones of the head and face are not often seen. Aneurysms in the head and neck regions are relatively frequently seen after operative procedures. Fischer mentions an aneurysm of the internal maxillary artery which Surrage observed after the extraction of a third molar.

A summary of the purely traumatic extracranial aneurysms found in the literature, including two within the author's own experience, is as follows: Internal carotid, 6; internal maxillary, 4; external maxillary—superficial temporal, deep temporal, and ascending pharyngeal, each 1.

The author carried on some animal experiments (rabbits) to determine the forms of the wounds, resulting in aneurysms, which could be inflicted by sharp, cutting objects. In only two instances was he successful in producing aneurysms artificially. These experiments are detailed and their significance discussed.

The treatment of aneurysms is divided into two groups—(1) general, and (2) local. The former method is usually the only one applicable in the case of internal aneurysms. The essential feature of this is to keep the patient in a condition of absolute rest, so as to equalize and minimize cardiac activity. In the case of intracranial aneurysms iodin preparations show a favorable action. When it is known that the lesion is of syphilitic origin many authors recommend iodin, mercury, and salvarsan. Operative interference can also be resorted to, in the form of ligature of the internal carotid.

The operative or local treatment plays the greater rôle in the case of the aneurysms of the head and neck arteries. The methods here applicable are those of Hueter and Hunter. Hueter's method consists in the ligation of the afferent and efferent arteries as closely as may be to the sac and when possible the total extirpation of the aneurysm. In the case of small aneurysms of the external and internal carotids (the latter very rarely), thyroid, lingual, and any of the superficial arteries whose anatomical relation warrants the employment of this method, Hueter's technique is followed.

For Hunter's method a point on the afferent arterial branch is chosen, and here it is ligated. In the case of the larger cervical arteries, and the extracranial arteries covered by muscles and fat, and in the case of all intracranial arteries, Hunter's operation is that indicated.

So far as the author knows, arterial suture or transplantation has not yet been applied to cervical arteries for eradication of aneurysms.

In looking back over this very extensive report on cervical and cephalic aneurysms one must admire the diligence and care with which Holbaek-Hanssen has presented so thoroughly such an unusual topic. Although it has but slight affinities with the exigencies of general dental practice, though relatively and absolutely rare, it becomes of interest at this time, when the frequency of such lesions is increased in the casualties of warfare.

[*Journal of the American Medical Association*, December 1, 1917.]

Facial Paralysis Following Pasteur Antirabic Treatment. By Robert L. Levy.

There are records of only 150 cases in which paralyses have followed the use of this treatment, and of these patients but 25 died. Levy reports here a case of facial diplegia with onset 73 days—an exceptionally long latent period—after the beginning of the prophylactic inoculations. This is an unusual form of "treatment paralysis." The author includes in this article a table and analysis of 10 other cases of facial paralysis, from the literature, following antirabic treatment.

[*British Medical Journal*, November 17, 1917.]

The Relative Germicidal Efficiency of Antiseptics of the Chlorin Group and Acriflavin and Other Dyes. By H. D. Dakin and E. K. Dunham.

"The object of the following paper is to point out certain common errors in the testing of antiseptics of the chlorin group which lead to totally inaccurate inferences as to their germicidal potency; secondly, to compare the results obtained by methods eliminating these errors with those furnished by other antiseptics; thirdly, to examine the claims for the alleged vastly superior germicidal potency of acriflavin and certain other dyes; and lastly, to indicate how important the matter of the velocity of disinfection is in forming a judgment of the utility of antiseptics in surgical practice, and also the methods suitable for their successful employment."

After a detailed report of the extensive experiments *in vitro*, the authors summarize their work as follows: "(*a*) The rapid and complete disinfection brought about by solutions (one volume) of members of the chlorin group of antiseptics of the strength commonly used in the treatment of wounds, when added to heavily infected blood serum-muscle extract mixture (two volumes); (*b*) under similar circumstances, solutions of acriflavin, proflavin, brilliant green, and malachite green failed to sterilize in six hours mixtures which the chlorin antiseptics sterilized completely in five minutes or less."

PERISCOPE

Using Beeswax.—When beeswax is left immersed in water that is too hot, its useful working qualities are impaired. A blanching or whitening of the surface shows that it has been heated to too high a temperature. A rather large volume of water at the right temperature (about 40° to 50° C.) should be employed, and full time allowed for the beeswax to become warmed and softened throughout.—D. M. Shaw, *Dental Record*.

Dental Neuralgia or Pain Referred to Branches of the Fifth Nerve.—Patients who have only the roots of carious teeth remaining may suffer much from neuralgic headaches, referred to various parts of the head, but often appear to have lost the toothache which they had prior to the crowns of the teeth breaking off. They are then reluctant to believe that the roots left are the cause of the headache, for, as they express it, they "have no toothache now, only headache." I often tell them that the result of the referred pain is much the same as the confusion which exists in a servant's mind as to which bell has been rung in a house.

It is not infrequent for patients to seek medical advice for what they believe to be inflammation in the ear, while on examination the ear is found to be quite free from trouble, although a posterior molar is badly affected. An opposite case is where patients insist on having a number of sound teeth extracted, while the real trouble is the far more serious condition of disease of the Gasserian ganglion. Occasionally pain, usually caused by a diseased lower molar, is referred to the shoulder or arm, and is then apt to be wrongly diagnosed as neuritis. Reflex paresis or paralysis affecting the arm has occasionally disappeared on extraction of an offending tooth.—T. Wilson Smith, *British Dental Journal*.

Taking Impressions with Modeling Composition.—When the compound is molded properly on the tray, immerse the external aspect of the tray for a few moments in cold water—this prevents the heated metal causing discomfort and sometimes pain to the lips—dry and dust the surface of the compound with a fine quality French chalk, and take the impression. This method gives very fine definition, the compound does not stick to the teeth, and the general result is a source of pleasure to the dentist and his patient.—*Oral Health.*

Inlay Strengthener.—When you are having trouble in making an m. i. d. or an m. o. d. inlay, due to shrinkage or something else that seems to prevent it from going to place even though the casting seems to be perfect, it may be due to faulty investing, poor wax technique, or shrinkage of gold. If you will make a staple of clasp-metal gold wire to extend from the mesial into the distal portions of the cavity and build the wax around this staple you will reduce this trouble to a minimum. Inlays made with this reinforcement make stronger anchorages for bridges than those without the staple.—*Pacific Dental Gazette.*

Hutchinson's Teeth.—It has been said that Hutchinson's teeth are pathognomonic of syphilis, but it is not so. You have all had cases of these small pits which run in lines across the teeth, and if you know your anatomy you can tell at just what time the fever occurred in the child. Any eruptive fever, no matter what, will produce an eruption of the skin, and a disturbance of the mucous membrane will be followed by indentations made in the teeth, along their borders or across them, known by surgical writers and syphilographers as Hutchinson's teeth. They are not due to syphilis any more than they are to scarlet fever or any other eruptive disease. They are the result of inflammation which prevented the proper nutrition of the tooth enamel at the time it existed. This statement was indorsed most emphatically by Dr. G. V. Black when I made it many years ago.—TRUMAN W. BROPHY, *Dental Review.*

Lancing the Gums in Difficult Dentition.—I am willing to concede that dentition is more generally normal than otherwise, and that the more aggravated and serious symptoms are, comparatively speaking, seldom met with in children otherwise healthy, and who receive proper care and attention as regards food and surroundings. Still, I believe that dentition is more frequently the cause of minor pathological conditions than is usually supposed, and, recognizing the serious conditions that may be caused by erupting teeth, I know of no reason for not making the rule to lance in all cases where there is the least possibility or even probability of the pathological conditions of eruption. By lancing, I do not mean scarifying the gums, but deep, thorough cutting down to the tooth. The etiology of this condition is not the pressure of the advancing tooth against the overlying tissue, but the pressure of the jagged unformed roots—which have elongated due to their growth, and have not room to advance because the tissue overlying them has not been proportionately resorbed—back upon the engorged and hypersensitive pulp. Lancing makes it possible for the tooth to advance; the pressure is relieved; pain subsides, and conditions return to the normal. Consequently relief is often afforded even when the tooth is not nearly erupting.—E. A. GUILFUSS, *Dental Review.*

Apothesine, the New Local Anesthetic.—Apothesine is the hydrochlorid of gamma-diethyl-amino-propyl cinnamate. It occurs as small white crystals, having a melting-point of 137° C. It is readily soluble in alcohol, slightly soluble in acetone and ether, and very soluble in water. It is quite stable, and will keep indefinitely if reasonably protected from contamination. The solution in water is neutral to litmus. It is precipitated from solution by alkalis and by the ordinary alkaloidal reagents. If desirable, the solution may be sterilized in the usual manner by heating to the boiling-point of water. As is the case with all anesthetics and alkaloids, the best results are insured by the use of freshly prepared solutions. It is supplied in the following forms: H. T. No. 216 (vials of 20 and 100 tablets). Each tablet contains $1\frac{1}{4}$ gr. of apothesine. One tablet dissolved in 60 minims of water—or normal saline solution—makes a 2 per cent. solution (approximately). H. T. No. 217 (vials of 25 and 100 tablets). Each tablet contains $\frac{3}{8}$ gr. apothesine and $\frac{1}{500}$ gr. adrenalin. One tablet dissolved in 60 minims of water—or normal saline solution—makes a 1 per cent. solution of apothesine, in adrenalin 1 : 30,000 (approximately). This anesthetic is a product of Parke, Davis & Co., and from reports received its toxicity is about the same as novocain, and it has the same resistance to boiling. As a local anesthetic it appears in no way inferior to novocain.—*Texas Dental Journal.*

Dark Areas in the X-ray Film.—Unfortunately many patients have had teeth extracted that could have been saved through scientific dentistry. The reason for the extraction of these teeth was that the dentist was led to believe that the presence of certain dark areas in a dental film was sufficient ground to warrant immediate extraction, thereby removing the primary cause of the systemic condition. This brings me to the interpretation of dental radiographs. Strange as it may seem, the X-ray has been and is much abused. The Roentgen ray was never intended to reveal the exact pathological findings at root-ends. The best that it can do is to aid us in our various tests to draw our conclusions. No man has a right to base his treatment on the reading of an X-ray picture without taking into consideration the various tissue changes that may take place. When men have a true understanding of the tissue changes that take place in acute and chronic inflammation, and are familiar with the histopathology of morbid conditions involving root-ends, then and then only can they realize that the dark area involving root-ends in a radiograph does not always mean a root abscess, or a blind abscess; that the dark area may be nothing more than less density of bone, an epithelial root tumor, a root cyst, an innocent granuloma, a suppurative granuloma, an apical osteitis, osteitis fibrosis cystica, a rarefying apical osteitis, a root-end necrosis, a root-end cementoma, or a proliferative pericementitis. Unless a man has an understanding of these various pathological manifestations he has no moral right to interpret radiographs.—M. N. Federspiel, *Dental Items of Interest.*

Thorough Mastication as an Economic Measure.—By thorough mastication of food, people would eat much less, get just as much nourishment from the smaller quantity, and avoid frequent digestive disturbances. Mastication is nature's cleansing agent for the teeth, and thorough chewing of the food is an important factor in the maintenance of the dental organs in a condition of health and cleanliness. The teeth, if they are to obtain their proper blood supply, need exercise just as much as any other part of the body.

By thorough mastication, a correct physiological flow of saliva is maintained simultaneously with the ingestion of food, and it is only under such conditions that the salivary secretion is thoroughly incorporated with the food, and thus enabled to properly perform its normal digestive action.

Gum-chewing is but an artificial substitute for mastication. It is a bad habit, causing an abnormal flow of saliva between meals, and if indulged in throws the whole digestive process out of balance.

"Twice the chewing and half the sweets" is a splendid wartime motto for school children. The over-ingestion of sugar in its many different forms—candy, honey, jam, syrups, etc.—has much to do with the alarming prevalence of dental decay. Statistics recently gathered show that while infectious diseases have been materially reduced, there has occurred a marked increase in diseases of the digestive tract, and much of this increase is doubtless due to the "bolting" of food, and over-indulgence in sugar.

Encourage the boys and girls to save teeth, save health, and reduce the high cost of living by the more thorough mastication of food and less indulgence in sweets.—*Oral Health.*

Formulary for Full Upper or Lower Impressions.—The three requisites for a satisfactory impression are (1) areal contact, (2) peripheral bearing of the base-plate, and (3) extension upon yieldable tissue for retention.

Areal contact means contact over the whole area included within the periphery of the base-plate, but does not signify uniform pressure over its whole surface. If the bearing is at the periphery of the base-plate, it will make no practical difference whether there is uniform pressure within the periphery, only so there is contact. If the bearing is at the periphery of the base-plate the artificial denture cannot rock, but if it is at some distance within the periphery there will be rocking and insecure retention.

Areal contact can only be assured by embedding the tissues in a material that flows, one that is neither flexible nor elastic. Thin mixed plaster best serves this purpose.

Peripheral bearing cannot be brought about by a thin mix of plaster alone, but can best be produced by a tray made for the case, or a Britannia metal tray reinforced with pure yellow beeswax, carrying a thin mix of plaster. The thin plaster simply assures contact; the wax secures the required compression over the desired portions of the impression and holds the soft tissues firmly and evenly against their bony foundation. This compression cannot be satisfactorily done by carving either the impression or cast.

Extension for retention is only necessary when the periphery of the base-plate is not supplied with yieldable tissue. For retention the labial and buccal flanges of the base-plate

need only be high enough to exclude ingress of air; however, esthetics may require much extension of the flanges. The essential part of a base-plate to be extended on to yieldable tissue to get retention is the palatal border, from the external portion of one tuberosity to the external surface of the other. The palatal extension upon yieldable tissue should be one-eighth to one-fourth of an inch in width. The palatal extension for retention must hold the soft tissues firmly against its bone foundation, or it will act as a tickler and suggest nausea.—GEO. H. WILSON, *Dental Summary.*

The Perfect Plaster Impression.—*The individual tray:* The first or basal essential in the taking of a perfect impression is a tray suited to the case; in other words, a tray that fits, and from the nature of the work a special tray is necessary to get perfect results.

The S. S. White Impression Tray Compound was devised for the particular purpose of making these individual trays quickly and economically. It is somewhat of the nature of a modeling composition, but with differences that adapt it specially to the making of trays. It is jet-black in color to make it readily distinguishable; has a high melting-point to assure when set or hardened ample rigidity to be self-supporting and to be unyielding when trimmed to a thin edge; and is readily cut as may be desirable in shaping it.

Making the tray: It is necessary in employing the impression tray compound to have a few regular metal trays of suitable forms and sizes. Take a metal tray of the proper shape for the case, but somewhat larger than you would ordinarily use. Fill it with the compound, softening in hot water; a higher heat will be required than in softening ordinary modeling composition. Pass it over a Bunsen or alcohol flame to soften and remove inequalities in the surface and to give it a glaze. Plunge quickly into hot water to wet the surface to prevent it from adhering to the tissues, and as soon as it cools to a bearable degree insert in the mouth, and secure an impression in the regular way. In a short time it can be removed from the mouth and placed in cold water to harden.

Remove the impression from the metal tray, and trim away the compound until you have a thin tray form with the margins about one-eighth inch shorter than the finished outline of the plaster impression is to be. To make sure that there shall be no impingement of the tray form against the soft tissues, and to allow the plaster for the impression plenty of room to escape freely instead of being forced against the tissues, the inner surface of the periphery should be trimmed to a rather sharp edge. Make sure that you do not trim it too much, as otherwise the plaster when applied in the tray form may not be carried to place—for if it is it will break off because of the long overhang. If you should happen to trim the form too short, the difficulty can be remedied by fusing more of the compound to the form wherever desired, inserting in the mouth while soft, and allowing the tissues of the mouth to properly form the tray outline, which can then be cut down a little to allow for the plaster. Finally score the palatal surface to give the plaster a hold.

We now have a tray that perfectly conforms to and fits the individual case, with no bulky projections or protruding edges to impinge upon and distort the soft tissues or push them from their normal positions.

The impression material: The second essential to the making of a perfect impression is a material of a consistence that will yield without offering the slightest resistance when applied to the delicate soft tissues of the mouth, and then set or harden quickly into a rigid, non-elastic mass bearing the perfect impress of every detail of the surface with which it has been brought into contact. Plaster mixed thin—so thin that it flows—is the ideal material for making impressions. The superiority of plaster as an impression material has always been recognized. The following method shows the way to utilize it to get the ideal results that have been the aim and the despair of prosthodontists from time immemorial.

Getting the perfect impression: Have the patient sit erect in a normal position. This closes the fauces and prevents the plaster from passing down the patient's throat. Mix clean, fine, quick-setting impression plaster so thin that the compound tray when dropped into it—which is the next step—will sink. The plaster should be sifted thoroughly at the time it is used, to be sure that it is freed from any lumps caused by dehydration, as commonly found in plaster. The idea in mixing the plaster to this consistence is to make sure that when placed in the mouth it shall be thin enough to flow readily around and over the soft tissues without disturbing them. Lift out the tray, allow all excess to flow off, insert in the mouth with a rocking motion, and have the patient close the mouth and drop the lips to their normal rest position. Wait a few minutes for the plaster to set before withdrawing. In rare cases

this first impression is all that is required, but usually some parts of the tray form will remain uncovered by the plaster, showing compression of the tissues from imperfections in the shape of the tray form, or because it is too long. Trim all such places away, and make a second trial. Sometimes a third, and rarely, through faulty technique, a fourth trial may have to be made. Whenever the impression fails to be satisfactory, trim away all excess of plaster, thinning down the peripheral edge to provide space or vent to facilitate escape of the plaster, and thus avoid the stress that would cause the displacement of the soft tissues. Make a new mix of the plaster—very thin—add a little salt to hasten the setting, drop the trimmed tray and impression in the mix, and proceed as before. As often as imperfections appear, trim and try again. The method properly carried out will produce a perfect impression, from which a plate can be made which, because of the accurate adaptation, dispenses with the need for air chambers, suction devices, and the like.—RUPERT E. HALL, *Dental Items of Interest.*

HINTS, QUERIES, AND COMMENTS

Amalgam Restorations for Gold Crowns.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—Permit me to offer a few random thoughts with regard to making gold crowns.

Roots to be banded for crowning should always be prepared approximally and distally according to the Black method for cavity preparation, and in the case of gold crowns the entire root should be restored with amalgam, so as to allow a top thickness of approximately 2 mm., or twice that thickness if the masticating has to be done on a few teeth, or if the gold is to be opposed to porcelain.

In preparing the approximal surfaces at the gum line secure all the space possible, that it may be even greater than the original space when the artificial substitute is inserted.

After the amalgam has fully hardened polish it at the point where it joins with the root. Previous to the amalgam restoration, saturate the root with silver nitrate solution, and before inserting the amalgam tease cement over the cavity, removing it from the margins after beginning the amalgam restoration.

Use seamless bands, and cast the occlusal surfaces of all-gold crowns. When the crown is complete—if of the all-gold variety—trim the band just to the gum line lingually and buccally, but do not allow it to extend to the gum line between the teeth. The completed crown should be placed on the root and the contact points tested with floss. If these are faulty, they should now be corrected with small pieces of solder properly placed and flowed. Before setting the crown paint the amalgam root-restoration with silver nitrate, and cement in place with a standard copper cement, burnishing the collar to the root carefully before the cement sets. All contiguous crowns should be soldered together.

These methods protect the gums, and make for efficiency. Thus we may earn the gratitude of our patients and ward off the just criticism of hygienists on our incubators of disease germs.

Many molars can be best entirely restored with amalgam, which when properly done is a work of art, and should command a much higher fee than the gold crown, cast or otherwise.

Do not lose sight of the necessity of cutting away the approximal and distal surfaces of bicuspids and molars, no matter how sound, according to the Black method, before crowning. It is the only way in which you can easily gain the necessary space and leave a smooth joint beneath the free margin of the gum at the point where we are most likely to have trouble.

GEORGE E. SMITH.

Byron, Ill.

OBITUARY

Dr. Francis Leroy Satterlee.

DIED, at his home in New York City, Monday, November 12, 1917, in his seventy-first year, after a lingering illness, FRANCIS LEROY SATTERLEE, M.D.

Dr. Satterlee was born in New York City, and was graduated from New York University in the class of 1865, and New York University medical school in 1868. He was a practicing physician in that city for many years, and retired from active work only a month before his death He was professor of physics, chemistry, and metallurgy in New York College of Dentistry for fifty years, retiring as professor emeritus several months ago.

Dr. Satterlee was police surgeon for nearly eighteen years, retiring as such twenty years ago. He was attending physician at St. Elizabeth's Hospital and consulting physician of the Midnight Mission, and formerly was the attending physician at the Northwestern Dispensary in the department of skin diseases and rheumatism.

He was the author of a treatise on rheumatism and works on gout which were used as text-books in medical colleges. He was an honorary member of the Society of Arts, London; a Fellow of the Academy of Medicine, the Geological Society, the New York Historical Society, and a member of the County Medical Society, the American Medical Association, the Medical Association of Greater New York, and the Pathological Society. He was also a member of the St. Nicholas Society, the Society of Colonial Wars, and the Sons of the American Revolution, and was once president of the Zeta Psi Fraternity.

Dr. Satterlee was married twice. His first wife, whom he married in 1868, died, and in 1906 he married Mrs. Mary Philipse Gouverneur Iselin. He is survived by his widow and two sons, Dr. Francis Leroy Satterlee, Jr., and Major Henry S. Satterlee.

"In Memoriam" Resolutions.

Dr. Frank B. Clarke.

Dr. Frank B. Clarke of Dubuque, Iowa, died October 8, 1917. While seated in his car talking with a friend he was seized with heart trouble, and passed away immediately.

The Dubuque City Dental Society adopted the following resolution:

Whereas, the Supreme Master of the universe, in His infinite wisdom has seen fit to summon to His heavenly home our dearly beloved brother, Frank B. Clarke; therefore be it

RESOLVED, That we, the Dubuque City members of the dental profession and of the Delta Sigma Delta Fraternity, desire to express to the family of our dear brother our most sincere and heartfelt sympathy in their great bereavement. The world has lost a good man, the dental profession has lost an honored member, and our fraternity has lost a beloved brother; and be it

RESOLVED, That these resolutions be published in the DENTAL COSMOS and the *Desmos*, and that a copy be sent to the bereaved family.

H. R. THILL,
R. M. BENN,
Committee.

ARMY AND NAVY DENTAL NEWS

Navy Dental Corps.

NUMEROUS appointments are being made by the Surgeon-general of the Navy to the list of reserve dental surgeons. These appointments are of applicants who are included in the current quota of the selective draft, and are given until December 15th to enter the military-naval service.

Army Dental Corps.

IT WILL be several weeks before it is possible to announce the result of the examination of candidates for appointment to commissions in the Army Dental Corps. Some appointments may be made in advance of the approval of the completed list in order to appoint those who would otherwise be beyond the age limit.

No action has been taken in regard to the promotion of officers of the regular dental corps in accordance with the act of October 6th, several questions of the construction of the law, notably in the matter of the service in grade factor, remaining to be determined.—*Army and Navy Register.*

Regulations Under Selective Service Law Affecting Dental Students.

SECTION 151B of the new selective service regulations concerns especially medical students and hospital interns registered under the law. It became effective December 15th:

"Except in the following cases, no registrant may enlist voluntarily in the military or naval service of the United States.

"Under such regulations as the Surgeon-general may prescribe, and on receiving permission from the Surgeon-general to do so, any medical student, hospital intern, dentist, dental student, veterinarian, or veterinary student may enlist in the Enlisted Reserve corps of the Medical department, and thereafter on presentation by the registrant to his local board of a certificate of a commissioned officer of the Medical department of the army that he has been so enlisted, such certificate shall be filed with the questionaire, and the registrant shall be placed in Class V, on the ground that he is in the military service of the United States. There is no other ground on which such persons (as such) may be placed in a deferred classification."

The effect of classification in Class V is to exempt or discharge from the draft. Regulations to carry out these paragraphs will be issued by the Surgeon-general. The effect of the new regulations will be to extend to first-year medical students, after December 15, 1917, essentially the same privileges in respect to army service as are now enjoyed by students of the second, third, and fourth-year classes. The approval of the Surgeon-general will be granted to such students in well-recognized medical schools only.

Since, under existing conditions, it is extremely unlikely that further calls for the present draft will be made before December 15th, the fear expressed by first-year medical students that they may not be able to continue their medical course is unwarranted, if they have not already been cited for the draft by their local board. In that case the Medical department has no authority—*Journal of the American Medical Association.*

Assignments.

Army Dental Corps.

Week ending November 24th.

1st Lieut. George Krakow, now on temporary duty with 35th Engineers, Camp Grant, Ill., assigned to permanent duty with that regiment.

Army Dental Reserve Corps.

Week ending November 24th.

1st Lieut. Albert Mehrer to Fort Slocum for duty.

The following to Chicago, School of Plastic and Oral Surgery, Northwestern University Dental School, for instruction: 1st Lieuts. Jack W. Scherer, James V. Sparks, Frank S. Leonard, Floyd D. Leach, Earl T. Young, Sherman M. Fowler, Max C. Frazier, Donald M. Gallie, Jay H. Lee, Brien B. O'Bannon, Merton M. Postle, John Voss, Everett E. MacGibbon, Walter McN. Morgan, and George D. Siewert.

1st Lieut. Alexander W. McClean to Fort Worth, Camp Bowie, for duty.

1st Lieut. Charles Steffens to School of Plastic and Oral Surgery, Northwestern Uni-

versity Dental School, Chicago, for instruction and return to station.

The following to Camp Wheeler, Ga., for duty: 1st Lieuts. Deazil C. Barnhill, Clifton E. Donnell, and Ira D. Funkhauser.

Week ending December 8th.

Francis R. Steirly to Camp Fremont, Cal., for duty.

1st Lieuts. Louie T. Austin and Ray D. Curry to Presidio of San Francisco, Cal., for duty.

1st Lieuts. Fay T. Brown, Norman C. Spencer, and Harold A. Stone to Garden City, N. Y., concentration camp and supply depot, for duty.

1st Lieut. Hervé C. Manon to 30th Engineers, Camp American University, for duty.

The following first lieutenants to places for duty: Leroy C. Andersen to Camp Lawrence J. Hearne, Cal., and Magnus A. Gerde to Fort Barry, Cal.

1st Lieut. Alphonse L. Senecal to Philadelphia, School of Plastic and Oral Surgery, Evans Dental Institute, for instruction, and to Fort Slocum for duty.

Preparedness League of American Dentists.

(Organized under the auspices of the N. D. A.)

Headquarters—3 Professional Building, 131 Allen St., Buffalo, N. Y.

ADVISORY COMMITTEE.

J. W. Beach, N. Y.	F. M. Casto, Ohio.	J. D. Millikin, Calif.
H. J. Burkhart, N. Y.	T. P. Hinman, Georgia.	A. W. Viney, Calif.
M. B. Eshleman, N. Y.	O. U. King, Indiana.	C. J. Lyons, Mich.
F. W. Low, N. Y.	T. W. Brophy, Illinois.	H. E. Friesell, Pa.
H. A. Pullen, N. Y.	W. H. Logan, Illinois.	E. C. Kirk, Pa.
H. L. Wheeler, N. Y.	G. N. West, Illinois.	J. V. Conzett, Iowa.
L. L. Barber, Ohio.	T. B. Hartzell, Minn.	B. H. Smith, Md.
S. D. Boak, Ohio.	F. W. Hergert, Wash.	F. T. Murlless, Conn.
H. C. Brown, Ohio.	F. O. Hetrick, Kansas.	M. F. Finley, D. C.

To Every American Dentist.

By J. W. Beach, *Chairman*, Buffalo, N. Y.

President Wilson has asked that every resource for winning the war be utilized to the very limit. The dental profession forms one of the greatest resources for making our army efficient. You are an integral part of this great source of help to your country. Will you meet this responsibility as an American citizen should? Of course you will!

How Can It Best be Done?

Join the League *now*, and assist in its great work. Ten thousand new members are needed right away. If you are already a member, we ask you to get at least five more as soon as possible. The mouths of the men in our new national army must be made healthy and dentally fit before going to cantonment, and we must help to the limit of our ability.

The Preparedness League of American Dentists is a recognized agency for carrying on this work under the direction of the Surgeon-general's office, the National Dental Association, and the Committee on Dentistry, subcommittee of the Council of National Defense.

There are forty-five thousand dentists in the United States. Six thousand belong to the League, and have done the major part of the following work: July 16 to November 3, 1917: Fillings 60,946; extractions 35,909; cleanings 2,233; crowns 133; bridges 184; plates 165; unclassified operations 6,891—total 111.061. Thousands of operations not listed were performed prior to and since these dates.

If every one of the 45,000 had done his part, what a splendid showing we could have made. It is not too late to become a part of this great work for increasing the fighting power of our army. We know you are with us.

Don't let the Germans show all the efficiency! Let's show what we can do!

We've got to work together to win this war. Do your part by joining the League *today*, and we will give you real, properly directed work to do.

For membership send one dollar ($1.00), payable but once, to the Preparedness League of American Dentists, 131 Allen st., Buffalo, N. Y. (Kindly inclose business card to avoid mistakes in name and address.)

SOCIETY NOTES AND ANNOUNCEMENTS

NOTICES should reach the Office of the DENTAL COSMOS *not later* than the 11th or 12th of the month preceding that of publication.

American Institute of Dental Teachers.

THE next annual meeting of the American Institute of Dental Teachers will be held at Hotel Schenley, Pittsburgh, Pa., January 29, 30, and 31, 1918. The meeting as usual will be devoted to dental teaching. A number of the papers will deal with situations arising from war conditions. A cordial invitation is extended to all interested in dental teaching.

ABRAM HOFFMAN, *Sec'y*,
381 Linwood ave., Buffalo, N. Y.

Chicago Dental Society.

THE annual Clinic of the Chicago Dental Society will be held in the LaSalle Hotel, Chicago, Ill., January 26, 1918. The program promises to be one of special interest to the profession. Remember the date.

P. B. D. IDLER, *President*.
T. A. BROADBENT, *Sec'y*.

University of Iowa, College of Dentistry.

THE dedication of the new dental building of the College of Dentistry, State University of Iowa, will be held February 22d; the Alumni and College of Dentistry Clinic, February 23, 1918, in Iowa City, Iowa.

R. R. DEKRUIF, *Sec'y*,
Des Moines, Ia.

Minnesota State Dental Association.

THE thirty-fifth annual convention of the Minnesota State Dental Association will be held February 7, 8, and 9, 1918, at the University of Minnesota, Minneapolis, Minn.

All members of the National Dental Association are invited. For information, write

MAX E. ERNST, *Sec'y*,
1125 Lowry Bldg., St. Paul, Minn.

Connecticut State Dental Association.

THE fifty-fourth annual meeting of the Connecticut State Dental Association will be held at the Hotel Taft, New Haven, Conn., April 18, 19, and 20, 1918.

GEO. S. B. LEONARD, *Sec'y*.

Virginia State Dental Association.

THE Virginia State Dental Association will meet in Roanoke, Va., April 25, 26, and 27, 1918.

F. R. TALLEY, *Corr. Sec'y*,
Petersburg, Va.

North Carolina Dental Society.

THE North Carolina Dental Society will meet on June 19 to 21, 1918. Headquarters, Oceanic Hotel, Wilmington, N. C.

W. T. MARTIN, *Sec'y*.

North Carolina Board of Examiners.

THE next meeting of the North Carolina State Board of Dental Examiners will be held at Raleigh, N. C., beginning at 9 o'clock on Thursday morning, January 10, 1918. For further information and application blanks address

F. L. HUNT, *Sec'y*,
Asheville, N. C.

Montana Board of Examiners.

THE Montana State Board of Dental Examiners will meet in Helena, Mont., January 14, 15, 16, 17, and 18, for the purpose of conducting examinations. Applications should be in the hands of the secretary not later than January 1, 1918.

G. A. CHEVIGNY, *Sec'y*,
107 Clark Block, Butte, Mont.

Idaho Board of Examiners.

THE Idaho State Board of Dental Examiners will hold their next session in Boise, Idaho, January 14 to 17, 1918. Address

A. M. JACOBSEN, *Sec'y*,
255 E. Center st., Pocatello, Idaho.

North Dakota Board of Examiners.

THE next regular meeting of the North Dakota Board of Dental Examiners will be held in Fargo, N. D., beginning Tuesday morning, January 8, 1918. All applications and credentials should be in the hands of the secretary ten days prior to the date of examination. For application blanks and further information, write to

W. E. HOCKING, *Sec'y*,
Devil's Lake, N. D.

South Dakota Board of Examiners.

THE South Dakota State Board of Dental Examiners will hold its next examination at Sioux Falls, S. D., beginning January 7, 1918. All applications must be in the hands of the secretary by January 1st. Fee $25. Address

ROBERT JASMANN, *Sec'y*, Scotland, S. D.

Massachusetts Board of Examiners.

A MEETING of the Massachusetts Board of Dental Examiners will be held in Boston, Mass., February 11 to 15, inclusive, 1918, for the examination of candidates for registration. All applications must be in the hands of the secretary on or before February 2d. For further information address

GEORGE H. PAYNE, *Sec'y*,
29 Commonwealth ave., Boston, Mass.

UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING NOVEMBER 1917.

November 6.

No. 1,245,153, to LEO E. EVSLIN. Dental instrument.

No. 1,245,406, to WILLIAM T. UHL. Automatic water control for cuspidors.

No. 1,245,843, to HENRY W. WENZEL. Artificial tooth.

No. 1,245,879, to WALTER S. CROWELL. Dental cement.

No. 1,245,891, to AUGUSTUS H. ESTERLY. Gas burner.

No. 1,245,992, to LOUIS R. SIEGEL. Dental crown remover.

November 13.

No. 1,246,060, to WALTER W. CRATE. Artificial tooth.

No. 1,246,061, to WALTER W. CRATE. Artificial tooth.

No. 1,246,213, to E. & E. ZAWELS. Pneumatic atomizer.

No. 1,246,339, to ISAAC J. SMIT. Self-illuminating depresser for dental and surgical work.

No. 1,246,340, to ISAAC J. SMIT. Self-illuminating surgical illuminating speculum.

No. 1,246,408, to GILBERT DUDLEY FISH. Occlusograph.

No. 1,246,659, to FRANK RITTER. Adjusting device for chair backs.

No. 1,246,693, to CLINTON M. WOLFE. Mouth mirror.

November 20.

No. 1,246,899, to JAMES P. FLAHERTY. Apparatus and process of sterilizing dental and other instruments.

No. 1,246,999, to PAUL C. PINCHES. Shade guide.

No. 1,247,406, to SAMUEL L. JEFFERIES. Dental mixing slab.

November 27.

No. 1,247,953, to ELIAS T. GOLDBERG. Artificial tooth.

No. 1,248,030, to THOMAS STEELE. Carding device for artificial teeth.

No 1,248,242, to HENRY WARD BABCOCK. Dental process.

Jesse B. Green -

WHO HAS JUST CELEBRATED HIS CENTENARY ANNIVERSARY.

THE

DENTAL COSMOS

VOL. LX. FEBRUARY 1918. No. 2

ORIGINAL COMMUNICATIONS

Impacted Lower Third Molars.

By C. EDMUND KELLS, D.D.S., New Orleans, La.

[Copyright 1918]

THE removal of impacted lower third molars appears to be of more than passing interest to the profession generally, as evidence by the fact that such an operation is often the leading card at dental clinics, that papers upon the subject appear in our journals from time to time, and, moreover, from the fact that such cases are quite frequently met with in general practice. There appear to be two methods of removing these teeth:

(1) One in which the patient's jaw is chiseled away to such an extent that the tooth may be taken out whole, ether or novocain being used, according to the fancy of the individual operator. By whom this heroic operation was originated I am not prepared to say.

(2) The one in which the tooth itself is cut in two under novocain. The patient's jaw is handled gently, and the tissues surrounding the tooth are injured but slightly. This operation was originated by the writer and was first described before the National Dental Association in 1903.

It is hardly possible to witness the removal of these teeth by the heroic mallet-and-chisel method, to hear the resounding blows of the mallet, and not feel compassion for the patient.

The writer has attended several clinics where clinicians of national repute removed such teeth by this mallet-and-chisel method. In every case, however simple—and some of the cases were *extremely* simple—the patients were put "out of commission" for days, suffered for many days longer, and the wounds (for wounds really were made) were treated for several weeks thereafter. Where the operator took the operation more seriously and used ether, the patient spent one day before and several days after the operation in the hospital, making an average of from five to seven days, several of which were in bed.

Just imagine, if you can, what the total cost of such an operation would be to a patient—one day in bed before the operation and five days after; seven days' hospital charges, besides those of the chief operator, the anesthetist, and three

or four assistants! If a charity patient, what a burden upon those who "paid the freight"!

So much for the mallet-and-chisel method, with its mutilation of the patient and the consequent train of suffering, treatment, and expense.

Under the writer's method, the tooth itself is cut in two, as already stated, from one to two-thirds of the crown being cut away, according to the case, whereupon the released part of the crown is readily removed. The root portion is then grasped by special forceps designed for the purpose, and *drawn forward* into the space left vacant by the removal of the portion of the crown which has been cut away.

Once the root has been started from its socket and drawn forward, there is always ample space for its ready removal. It will be seen that by this operation little or no injury has been done to the soft tissues and surrounding or overlapping bone or process, and thus it is not surprising that little or no after-pain ensues, and no subsequent treatment is necessary.

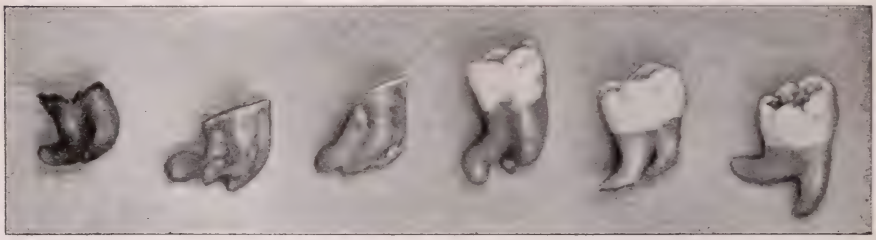
Sometimes an elevator specially adapted to such work is used to start the root. Sometimes, in particularly difficult cases, a little of the process must be *burred away* in order to get the beaks of the forceps on the root.

It is not unusual for a patient to come from the country in the morning, have such a tooth removed, and leave for home the same day. The sockets *are never curetted or packed; possibly that is why they require no treatment.* Sometimes there is a certain amount of inflammation of the throat, with discomfort and pain in that region, and in these cases the throat receives treatment; but even in these the sockets themselves have always looked well and have *received no attention whatever.* At other times, in very difficult cases, there is some swelling of the face, and the mouth cannot be opened freely; again these symptoms are treated, but the socket looks well and receives no attention.

TOOTH FORMS.

The writer has extracted scores and scores of lower third molars which were *standing vertically,* and which had all manner of roots (see Fig. 1), but he has never yet met, in his own practice, any impacted teeth of such shapes. In Fig. 2 are shown typical forms of impacted teeth. Their roots are all more or less straight and are of a distinctly different class from those shown in Fig. 1.

Fig. 1.



The question naturally arises, are these simply the vagaries of his individual practice, is it coincidence, or have other operators met with the same experience? It certainly would be interesting to know, and if perchance the experience of others has been the same, then for once Providence has been somewhat kind.

INDICATION FOR THE AUTHOR'S OPERATION.

The writer's operation is only indicated where the third molar is really *impacted,* that is, when it lies more or less horizontally and is prevented from

erupting by its relative position to the second molar.

SPECIAL FORCEPS.

As far as the writer knows, every pair of extracting forceps now cataloged was

FIG. 2.

designed for grasping teeth standing in a perpendicular position.

In the early days of this operation, after the part of the crown of the impacted third molar was cut off, the root was removed with an elevator. The use of an elevator, however, is a harsh procedure, especially in such cases as those under consideration, and so the idea was conceived of making a special pair of forceps with which to grasp the remaining portion of the tooth and draw it forward, thus materially lessening the trauma.

Fortunately, a pair of Ash's forceps was found which, with only a slight alteration, made an ideal instrument for this purpose, and undoubtedly by its use the trauma has been materially lessened in every case. Fig. 3 shows how a typical impacted third molar can be firmly grasped by these forceps. In deeply embedded molars it is necessary to bur away the process to allow the beaks to be forced into position.

In a recent number of the DENTAL COSMOS a writer upon the subject has illustrations showing how he cut off the cusps of *some* of these molars with disks, advancing the method as new. This shows, of course, his unfamiliarity with the literature upon the subject, as the idea of cutting off the cusp was first published in 1903, as previously stated, once or twice since, and is fully treated in the third edition of Johnson's "Text-book of Operative Dentistry," though, of course, the cutting is not done with disks, as the use of disks for the purpose is almost impossible. It is possible, of course, to cut away the cusps of well-exposed teeth by means of disks, but it never should be so done. The unerupted portion of the crown is covered upon two sides by gum tissue, and possibly some process. The disk must therefore cut gum, process, and all, lacerate the parts fearfully, and play havoc generally!

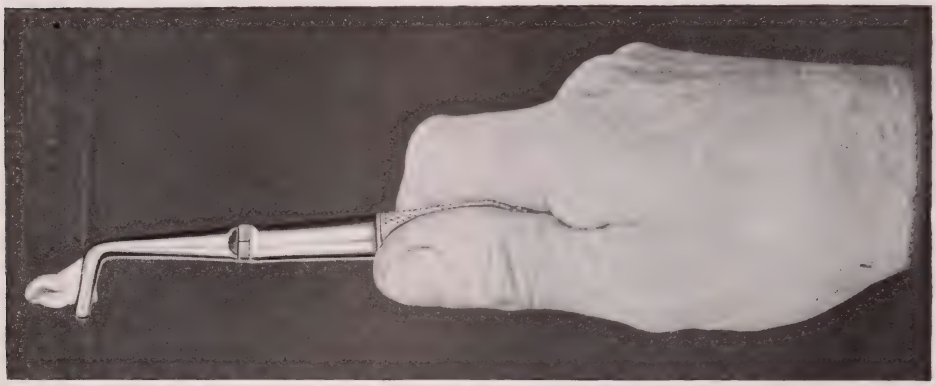
When it comes to deep-seated molars, the lower edge of the tooth which must be cut away may be fully three-quarters of an inch below the top of the second molar. In order to reach this depth the disk must be over *one and a half inches* in diameter. Just get a disk of that diameter, mount it, put it in the engine handpiece, and adjust it back of a second molar, and see how impossible it would be to use it!

The writer does all of the deep cutting with burs made specially for the purpose. In favorable cases he may start with a short bur, but the burs must be extra long to reach to the depths often required. (Fig. 4.)

The enamel is first nicked with a carborundum stone in order to allow the burs to get a start. The contra-angle handpiece is held horizontally above and about parallel with the tops of the molars, and rotated so as to swing the bur possibly from twenty to thirty degrees to each side of vertical, and an up-and-down, sawing motion is also given to the bur. In this manner, the operative field is limited to the space from which the overlying gum and process have been removed. The gum and process upon the lingual and buccal sides of the tooth are encroached upon but slightly, if at all. Consequently, there is but little laceration of the parts and but little loss of blood.

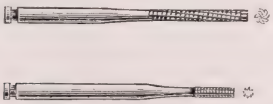
A saliva tube is placed in the opposite side of the mouth, while an assistant keeps the operative field absolutely free from saliva, mucus, and blood by means of a suitable "tip" connected to an aspirating machine. Frequently, not a single "sponge" need be used. By this method much time is saved, the patient swallows no blood or mucus, and the work proceeds at a minimum of discomfort and maximum of speed.

Fig. 3.



The beaks of these forceps have been ground out so that they are somewhat similar to those of the well-known "Kells" forceps, which were first made by the writer's father some forty or more years ago. The bulge of the crown fits into the hollow beak, so that the beak does not slip off. When the tooth shown in the illustration was grasped by these forceps for removal, the beaks did not protrude beyond the tooth as shown, but were forced down only as far as the surrounding process would allow them to go, and *yet* they secured a firm hold upon the tooth. The tooth was drawn straight forward in the line of its long axis, and thus very little strain was made upon the surrounding process. The tooth was twisted and rotated slightly in order to start it from the socket, just as would be done in extracting a vertical tooth.

Fig. 4.



Just imagine for the moment a dentist himself with such an impacted molar! On the one hand, he can have it removed absolutely painlessly in the manner just described, lose a few hours, all told, from his office, and no after-treatment. Or, he can have it chiseled out under novocain, undoubtedly lose from one to several days, and have the socket packed for weeks. Or, he can take a general anesthetic and have it removed by the mallet-and-chisel method, spend a goodly number of days in a hospital, losing that many from his office, and have the socket packed and treated for several weeks

thereafter. With the choice of these three evils, it is not difficult to decide which one he would choose for himself; then why not make the same selection for his patients?

INFECTION.

A volume might be written upon the subject of infection, and the writer is assured in advance of severe criticism of his ideas of oral infection, but it will be noted that these criticisms only come from those who cling to practices of the past, who have not tried his methods, and therefore are in no way capable of judging of his results. Facts, like mules, are stubborn things, and the patients themselves are incontrovertible evidences of the soundness of his methods.

While some of the leading oral surgeons and clinicians of the day curet and pack the socket after removal of the impacted tooth, what have they to show for it? Only suffering and discomfort, inconvenience and expense!

MODERN SURGICAL PRACTICE.

It is an assured fact that the better class of general surgeons are getting farther and farther away from *drains and packings*. Twenty-five years ago, ninety-five per cent. of clean abdominal operations were drained. Today, unless there is considerable oozing or strong suspicion of active infection, no drains are used. Whenever a drainage-tube is used, the natural exudate is constantly interfered with by the irritating action of the tube, and therefore the period of healing is prolonged.

Of late years the general surgeon, that is, the more observing general surgeon, has come to realize that the less he does after the operation to interfere with the natural processes of repair, the better it is for the patient.

When the writer discontinued the packing of sockets, many years ago, he still considered it necessary to wash out the wound from day to day with an antiseptic solution, and devised an apparatus for doing this, but for several years past this also has been absolutely discontinued, upon the principle that the less we do for that socket after a nice clean surgical operation has been performed, the better it is for the patient, and the results obtained prove the theory to be correct.

CHARACTER OF CLIENTÈLE AS A POSSIBLE FACTOR.

Possibly the character of the practice bears some relation to the possibility of infection. It must be admitted that all of the writer's experience has been with the better class of patients, and thus he deals practically only with rather clean mouths, pretty well taken care of.

Possibly patients in a charity clinic might not make such a favorable showing, and in that case he can conceive that even with his operation the daily flushing of the socket with warm saline solution might be advantageous for a week or so, though he doubts it. But as for packing, Never!

NATURE'S METHOD OF CARING FOR WOUNDS CAUSED BY EXTRACTION.

Let us now consider what occurs after the extraction of a tooth when nature is given a chance. First, hemorrhage occurs and then the socket is immediately flooded with saliva—saliva possibly carrying some pathogenic organisms.

A blood-clot is formed in the socket and some active ferment is at once formed in the tissues practically in contact with the blood-clot, and this successfully combats the organisms carried in the saliva. An exudate is thrown out, and under these circumstances healing takes place rapidly.

SURGICAL INTERFERENCE.

On the other hand, a tooth is removed, whereupon blood flows and the socket is again flooded with saliva. But not contented with nature's way, the socket is curetted and packed with gauze. Or, possibly, it is just packed with gauze without being curetted.

Under these adverse conditions, does

nature just "throw up the sponge" and quit, and leave it all to the surgeon? Not at all; she still does the best she can to overcome his errors, and starts the ferment, the exudate, and the process of healing. Next day comes the operator, who removes the packing, which process simply tears to pieces the work of healing which nature has been doing during the previous twenty-four hours. Then he repacks the wound, only to repeat the destructive process next day.

USE OF IODIN IN THE SOCKET CONTRA-INDICATED.

Possibly the socket is swabbed with iodin. Now, what does that mean? One of two things: (1) If the socket has not been effectively dried (which usually is impossible) and iodin is applied to the wet surface, it is absolutely ineffective—just so much time and iodin wasted; and (2) If it were possible to thoroughly dry this surface and apply the tincture of iodin to it, then iodin, being destructive to such a new growth as is found in a healing socket, does it more harm than good, and consequently, better results and quicker healing would be expected without its use.

However, as a matter of fact, it being practically impossible to dry these surfaces, the iodin does not do very much harm after all. And so this continues for days and weeks! A large portion of what nature accomplishes during twenty-four or forty-eight hours is quickly destroyed by the removal of the dressings. And what have the dressings accomplished? Merely a prolongation of the period of healing.

A truthful verdict upon the procedure would probably read, "The socket gets well in spite of the operator, instead of on account of him."

CHARACTER OF THE BONY STRUCTURES.

If a section be made through the bony socket of the impacted molar, it will be observed that the portion of the bone covered by the periosteum is very dense and *very smooth*, while all the bony structure within and protected by this external smooth plate is not only porous, but exceedingly so.

Under the writer's operation, very little of this dense external plate is interfered with, and consequently the bone itself is left in the very best condition for prompt healing. Under the mallet-and-chisel operation a large block of this external oblique line is cut away and a large surface of the porous bone is left exposed, and, from its very nature, possibly invites infection and its consequent train of troubles.

CLIMATIC EFFECTS.

The writer spends a good part of his annual vacations in visiting hospitals, clinics, and his professional friends in their own offices, all in eastern and western cities. Long ago he concluded from what was seen upon these visits as compared with what he saw in his own office, that oral infections, even after ordinary extractions, were much more common in northern latitudes than in the south. The more he traveled and the more he practiced in his home city, the more he was convinced of this fact, but now he has changed his mind upon this point completely!

Is it a coincidence that all of this infection which follows tooth extraction which he has seen in the northern cities occurred in cases which were treated and *packed?* Or was the infection due to the packing and treatment?

One of the reasons the general surgeon—the progressive one to whom reference has already been made—has given up packings, is because he found that he occasionally reinfected his sterile wound by his packings.

THE TIME FACTOR.

It is admitted that the writer's operation, as practiced, is a somewhat lengthy one, but it is claimed that it is *humane.*

THE HUMAN FACTOR.

Simply because the method of removing such a molar by the mallet and chisel

is quick and comparatively easy, should such a method necessarily be employed? Again, simply because the writer's method is not quick and easy, but requires much more time and is much more difficult for the operator, should it be condemned? Should not the welfare of the patient be the paramount issue?

THE PRECEDENT OF GENERAL PRACTICE.

Just because a method is "general practice" does not necessarily make it correct practice. Some man of note "starts something"; it looks good and is apparently successful, and thus soon becomes general practice. After a while, possibly someone else, equally as prominent, brings out a much better method, and the most progressive men adopt it, and so what was general practice once upon a time is now only practiced by a few.

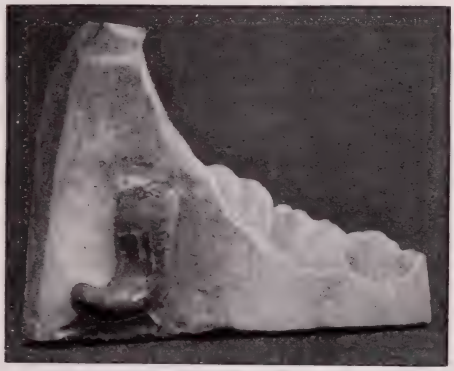
Under this rule, general surgery has undergone radical changes within the past few years, and it has been shown that some of these changes in general surgery were worked out independently by the writer in his operation for the removal of impacted third molars. Of late, a number of operators have adopted this operation, and undoubtedly, in the not distant future, all who have the best interests of their patients at heart will be compelled to give up the mallet and chisel, and also either adopt this method or devise one equally good—perhaps better—and get in line with modern surgical practice, discard the gauze packings, discontinue the disturbance of the socket, and give up using iodin where it is entirely ineffective.

1237 Maison Blanche.

A SPECIAL CASE CITED.

Fig. 5 illustrates a fine example of a vertical third molar which never erupted, and yet as the result of infection had closed the patient's mouth for a week before she called. The trismus was treated and reduced, and as soon as the region became accessible, the offending tooth was detected with the aid of the skiagraph, and extracted.

Fig. 5.



Notwithstanding the previous record, no curetting, packing, or washing of the socket followed, healing progressed rapidly, and the patient is not only still very much alive—two years later—but as fine a specimen of womanhood as one ever would want to see.

It would probably be difficult to find a better case than this one to illustrate the value of *no after-treatment* in these cases. An impression was taken before the extraction of the tooth, and after the model was poured the extracted tooth was set in the model in the position it held in the jaw.

Type *vs.* Temperament in the Selection of Teeth.

(IV.)

By NORMAN S. ESSIG, D.D.S., Philadelphia, Pa.

(Read before the monthly meeting of the Pennsylvania Association of Dental Surgeons, Philadelphia, December 11, 1917.)

THE subject about which I shall speak tonight has so long impressed me as being one of very large proportions that I am unwilling to concede that any other phase of dentistry exceeds it in importance.

I have the honor this evening to address the Pennsylvania Association of Dental Surgeons, yet I am constrained to believe that most of you are in general practice, and that many of you are at least occasionally required to perform a service in prosthesis. To be interested in but a portion of a subject is not to be interested at all, but to be interested in any subject in its entirety is to love it and find an interest in all its details.

I am bringing to you tonight, as a result of my own interest, an enthusiasm with which I hope to infect every man present; and to that end I have assembled certain facts, and evolved methods pertinent to them, to which I shall direct your attention.

It is a well-known fact that in prehistoric man, and through all subsequent periods of which we have any knowledge, there have existed at least three fundamental basal types of tooth form to which all others may be related and classified. The dentist, however, has made little use of these facts other than to accept them with reservation, and has continued to take what he could find in the way of artificial substitutes without availing himself of the practical helpfulness of a knowledge of these basal considerations now easily within his reach.

The study of the anatomy and physiology of human teeth, and the selection and adaptation of porcelain substitutes with reference to the restoration or creation of a temperamental harmony, which all true dental prosthesis embodies, is a part of our field of study as dentists that we can ill afford to neglect. To pass over this lightly is more than a neglect of duty to dentistry itself; it is to debase prosthesis by allowing that department to fall into the hands of the mere mechanic, who is in no way equipped or competent to render anything beyond a purely mechanical service.

I do not intend to offend or to detract from the importance of the skilled mechanician, but dentistry cannot be practiced by correspondence, nor is it reasonable to expect the highest esthetic attainment in a prosthetic restoration from one who has never seen the patient. The hope of creating a demand for better things in dental prosthesis by placing the subject in a comparatively new light is uppermost in my mind.

The discussion of "type *vs.* temperament" has always divided the point of view of the profession to such an extent that it has impeded progress along the lines of so-called "mechanical dentistry," and furthermore, it has prevented the subject from being taught from any definitely established standpoint. Consequently, I have assumed a rôle requiring some resolution and courage on my part, in that I shall endeavor to bring all parties together on the ground that the

difference is in appearance and not in reality, a difference of nomenclature only, and that the word "temperamental" applies only to the effect obtained by the judicious selection and application of true types or their modifications.

In recalling discussions upon the subject I have been convinced that the dental profession is less interested in theories along prosthetic lines than it is in facts practically systematized to their advantage and so placed before the practitioner as will enable him to make practical use of them in a systematic and rational way.

The existence of the basal types is so thoroughly an established scientific fact that argument upon that point at this date would be a waste of time. See writings of Williams and of the writer.*

The establishment of the basal types has done much to simplify matters, for as there are three prime forms as a basis for typal classification, it must also of necessity be the foundation for the temperamental theory as herein previously defined; consequently, those who once differed vehemently may now select their artificial teeth from the same assortment, and any remaining differences may be explained by the fact that the eruption and development of the teeth of the human race is from a practical viewpoint entirely arbitrary, as a result of the unrestricted interbreeding of human types, and teeth therefore become a law unto themselves. Consequently, as far as the dental profession is concerned in matters pertaining to the selection of artificial teeth, the term "temperamental" may be limited to express the result attained by the judicious arrangement and application of the basal types. Moreover, these types in nature, as progressively and automatically rearranged in the mouth of man by wear, by characteristic habitual mental traits, physical limitations, and changes due to the loss of other teeth, necessarily express characteristic temperamental harmony, or so-called temperament.

The policy which I have adopted in practice is to use as standards for the three fundamental types the strongest and most characteristic examples of each, and make suitable modifications expressive of crossings or composites to suit my purpose by changing the contour lines at certain definite points by grinding.

After carefully viewing the subject from its several angles we must eventually reach a point where we begin to discover the system or order involved in the sequence of events, which not only throws additional light on the principles underlying the question of selection, but also enables us to systematize the process and to clearly and definitely outline a policy which demonstrates its practical value, and at the same time illustrates the importance of the personal factor when methodically applied in prosthetic dentistry.

He who elects to study dentistry doubtless does so because he imagines he is by nature endowed with talents of a kind that will lead eventually to a measure of success in the practice of his chosen profession. During his collegiate preparation or the pre-graduate period an absolute failure in any one branch or department will preclude the possibility of his graduation; so also will the absence of the factor of personal fitness or adaptation to the requirements of his calling cause an absolute failure in the subsequent or post-graduate career of the student of dentistry; for one must ever be a student, and in consequence of the absence of this quality of natural or acquired fitness for the practice, we continually meet with examples of prosthetic dentistry which shock and outrage every artistic sense, even before the observer is near enough to determine whether or not there is any technical merit in evidence in the case.

It is to this end the writer has devoted time and thought in the past with the hope that an influence for the betterment of dental prosthetics might be brought to bear upon those on whose

* See, *e.g.*, my three former articles on "Type vs. Temperament in the Selection of Teeth," Dental Cosmos, 1917, vol. lx, pp. (I) 879, (II) 1110, and (III) 1218.

The Three Basal Types.

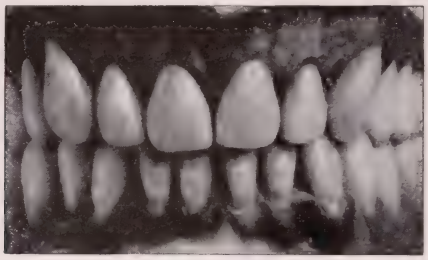
Fig. 1.

Type I.

Fig. 2.

Type II.

Fig. 3.



Type III.

Showing, in porcelain teeth, the three fundamental basal types, which are used as the basis for subsequent modification.

shoulders rests the burden of teaching the subject. He has therefore endeavored to systematize the solution of certain problems, and to lay before the profession his interpretation of the question of selection and artistic restoration in dentistry.

It is to be assumed that many, if not all, of the preliminary steps in the technique of mechanical dentistry have been adequately conventionalized and reduced to a system of sufficient simplicity and uniformity to enable those teaching the subject, throughout this country at least, to instruct the student along lines which are reasonably uniform, but it yet remains for the esthetic side to be as thoroughly and systematically taught with the idea of cultivating a broader conception of its importance and a larger development of the personal side of the question in the case of the individual practitioner. This can best be done when we have realized certain facts which, in the opinion of the author, are firmly established. These are of sufficient importance to be a tremendous factor in obtaining results which every man who has the welfare of his patients at heart should strive to achieve.

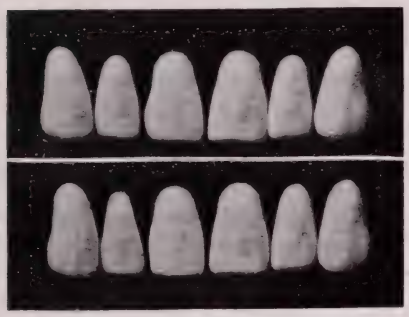
We as a profession must realize that there are important personal touches which must be the handiwork of, and cannot be neglected by, the individual responsible for directing the case in prosthesis. These can under no circumstances be done in the laboratory without reducing the result to the plane of a mere mechanical production, representing no more or no less than precision in finger skill, but absolutely lacking in character and artistic value.

The public must also be enlightened on the higher possibilities of dental art, and made aware that there are possibilities unlimited in this direction; that the production of an artistic prosthetic restoration is one of the highest progressive

FIG. 4.

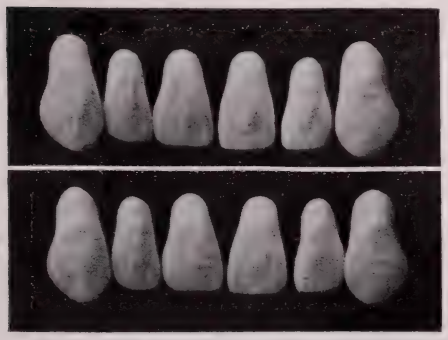
Type I (see opposite page) is here used as the base, showing a modification to produce a modified III (at *a*) and II (*b*) respectively.

FIG. 5.



Type II used as the base, modified to produce a modified III (*a*) and I (*b*) respectively.

FIG. 6.



Type III used as the base, modified to represent types I (*a*) and II (*b*) respectively.

attainment, and not a mere mechanical service. They must be made to understand that everyone owes something to his fellow man, and that no one has a right to shock the sensibilities of those about him by appearing in public or among his friends marred or modified in appearance by inadequate or inappropriate dental restoration.

Were we at all times provided with models of the original dentures, or if

FIG. 7.

Showing type II with modifications in contour and profile, also slight variations in lateral incisors.

FIG. 8.

Type III used as the base, with modified contour and profile, also showing possibilities in the laterals.

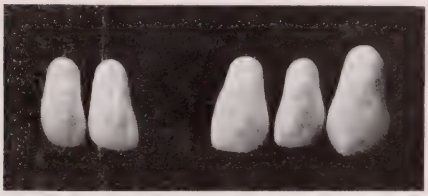
certain basal types of teeth were inevitably found in certain types of countenance, the task would be a simple one indeed; but as this is not so, the problem must be solved by other means—at least from the standpoint of selection.

After having fixed firmly in our minds the three basal types, and all that they mean as a basis of classification in the

Fig. 9.

Modified laterals to harmonize with both modified and unmodified centrals of type I.

Fig. 10.

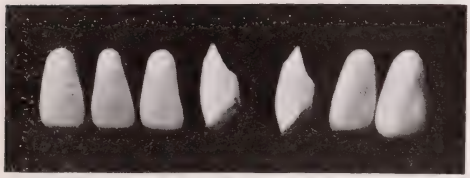


Same as Fig. 9, but relating to type III.

Fig. 11.

a

b



c

Showing central incisors (*a*) type I, (*b*) type II, and (*c*) type III, before and after modification of contour and profile together with changes in the lateral incisors to adapt them to special cases.

study of the comparative anatomy of the teeth of human beings, harmony of outline should be the first consideration in the selection of artificial teeth, as the size will be guided by the proportions of the arch and the proximity of the upper and lower jaws. To determine and obtain the lines of harmony, the plan or policy is to select a portion of the face having a characteristic bilateral symmetry, at a point nearest the teeth themselves;—obviously, from that portion bounded above by the eyebrows to a line drawn horizontally across the face through the commissure of the mouth at right angles with the median line drawn from a point between the brows, dividing the face in halves by bisecting through the nose and mouth. It will be found that the outlines confined within these measurements, embracing the most characteristically expressive facial area, will suggest the outline for the selection of artificial incisor teeth which will properly harmonize with the general outlines of the face. (See Dental Cosmos for November 1917, vol. lix, p. 1115.)

If the patient has a full, broad countenance with high cheek-bones, a full, broad tooth of a comparatively pure type is suggested; while, on the other hand, if the face falls away or is modified in other ways, the selection should be modified in outline and profile to suit the case in hand.

The full face suggests the general outline, while the profile of the tooth should represent the modification and profile of the countenance, to be harmonious.

In the three pure or basal types we have the best means of harmonious restoration, because the logical changes can be made by the operator who must design the alignment and articulation. If the result is to be one of artistic merit he must do this part of the operation with his own hands.

The form and outline of the basal types, in a given case, for the central incisors having been established definitely, attention is bestowed upon the laterals, which we find are a "law unto themselves" even to a greater degree than any other of the six anterior teeth, a peculiarity naturally attributed to certain influences which govern their surroundings during development, while

augmenting or curtailing such development according to the room allotted them while the capsule is soft and yielding. This produces great variation in natural normal mouths, and will allow the prosthetist to take liberties of a similar nature which are entirely within the limits prescribed by natural conditions.

That temperamental harmony can be obtained by this treatment of the lateral incisors there can be no doubt, but the incisors are incomplete without the cuspids, which give finish and character to both the function and the outline of the anterior teeth, which from the esthetic standpoint must be regarded as a unit in conformity and symmetry. These teeth should be draped with skill and judgment on each side of the median line, maintaining the harmony produced by the central incisors; the space between being completely filled by the laterals, whose general conformation should be in keeping, as has already been shown, with the room allotted to them.

Modification or digression from type is easily and readily attained by slight grinding at certain important points so that crossings and modified types of a much more appropriate nature can be thus produced than by selection from the manufacturer's stock.

Wherever there are natural teeth alongside of which artificial substitutes are to be placed, our opportunity for securing harmony and precision are much greater if we modify the basal type of artificial tooth to suit the case.

Where the patient is edentulous and there is no model of the natural teeth to guide, such modification is necessary in order to produce the required harmonious discord and a reproduction of those accidents of nature which are so cunningly interdependent that the lines individually and collectively fall away, together with that degree of concord whereby no one feature is given undue prominence.

It must be admitted, however, that there is a need of modification or crossings, and a limited stock of these modified typal forms is desirable from the standpoint both of the dentist and that of the manufacturer, but the more the dentist relies upon his own ability to create such crossings in special cases the greater will be the artistic development along these lines among the members of the dental profession. For whatever is done to break up regularity in form or shade, it will be found that the improvement is vastly out of proportion to the effort expended.

It will not be advisable or necessary at all times to change the buccal or labial surfaces of the artificial teeth, as many of the modifications which are frequently seen in natural teeth have their greatest variation from type expressed upon the approximal surfaces.

It has also been shown that an automatic readjustment takes place from the time when the permanent tooth is erupted, and that characteristic identity is largely brought about by what may be designated as the different stages of wear, which gradually modifies the general form of teeth as well as the conformation of their occlusal surfaces.

Color and shade must ever remain a matter of artistic judgment, though a dependable guide may be established by using as a basis of consideration the fact that in youth and comparative youth teeth are less dense, and consequently of a lighter shade, and each succeeding year the dentin ordinarily becomes more dense, with a consequent deepening of the shade toward a bone-like yellow.

The frailer organs of mastication and those which have never been strong will be found to have a lighter hue, which often has a bluish cast. There are other dark shades which, however, are often the result of some other influence, such as deposits of extraneous matter which interfere with the transmission of light; this can be imitated by means of mineral stains, the use of which will enable the operator to reproduce the appearance of nature with great accuracy, though it may be assumed that the general color of artificial teeth should be representative of health and vitality, modified by the age of the patient.

It is not possible to anticipate the form and shade of the teeth of mankind with a reasonable degree of accuracy by studying the different faces we meet daily on the street or in places where men gather. This the writer has proved to his satisfaction by repeated trials, with the result that the careful scrutiny of a face with this idea in view has become habitual. The cases, however, where there is found to be ideal harmony between the outline of the teeth and that of the face are rare indeed, and keen disappointment is often in store where the smile or conversation reveals the organs of mastication. We are all able, however, to anticipate with great accuracy the fact that an artificial denture is worn; especially is this the case in the upper mouth, and, except in rare instances where care and skill have been expended to compensate for shrinkage, due to the absorption of the alveolar walls after extraction, a peculiar blank or characteristic expression of the upper lip takes place which apparently influences the position of the nose. This is in large part due to the maladjustment of the canine protuberance. The extraction of the canine teeth will effect a greater change in the appearance of a man or woman than the loss of any other teeth in the dental arch; yet it would seem that comparatively little importance is attached to their proper and intelligent placement by those whose duty it is to assume the responsibility of the personal appearance of those who require a service of that character.

The types of artificial teeth having a bold profile are sadly lacking, especially in the No. III type, and it is often impossible to obtain such teeth at all, whereas many faces demand this type in order that the normal expression may be restored.

Our attention is often attracted to the fact that the artificial incisors are too prominent, or that there is a peculiar recession which is in reality due to the lack of profile, and a predominance of straight lines. This renders it impossible to obtain certain natural effects, both in the adjustment upon the ridge and in the rotation of individual teeth to produce or reproduce facial harmony.

To obtain the maximum in the artistic reproduction of the organs of mastication, the teeth should be placed upon the ridge as nearly as possible in the same position as the natural organs having roots which were fixed firmly in the gum tissue and their surrounding bony attachment. This effect cannot be accomplished in the majority of instances when a tooth of a flat character is used. But the difficulty may be overcome by selecting a tooth of ample size and good proportions in relation to the body of the tooth and the overlap at the cervix. Modifications can then be made to eliminate or produce certain lines which may be requisite and desirable to make harmony and confirmation in profile.

1700 Locust st.

Evolution of the Human Face:

Chief Stages in Its Development from the Lowest Forms of Life to Man.

By WILLIAM K. GREGORY, Ph.D., New York, N. Y.,
ASSISTANT PROFESSOR OF VERTEBRATE PALEONTOLOGY, COLUMBIA UNIVERSITY; RESEARCH ASSOCIATE, AMERICAN MUSEUM OF NATURAL HISTORY.

(Read before the Eastern Association of Graduates of the Angle School of Orthodontia, at its annual meeting, New York, May 8 and 9, 1917.)

I SUPPOSE if you have talked to people about evolution they have said: "Well, if monkey-like animals evolved into men at one time, why did not all monkeys evolve into men, and why are there any monkeys alive at the present time?" They ask me to explain it, and they regard it as an insurmountable objection to the theory that man has evolved from lower mammals. Now, I do not know why all the monkey-like animals did not evolve into men instead of changing only a little and remaining monkeys, but I do know that evolution, besides proceeding in different directions, also proceeds at different rates at different times. I know that just as there are many very advanced and progressive races, such as the horse and the humming-bird and the whale, which have undergone a very great modification during the vast period known as the age of Mammals, so there are also many conservative and backward races, such as the tapir and the opossum and the tuatara, which have undergone very little modification during the same period. These backward and primitive races are of the greatest use to us in deciphering the evolutionary history of past ages. They are living relics, or living fossils. A great many such relics are living today. That is what furnishes the material for comparative anatomy. It is by the dissection and study of these extant fossils and by comparing them one with the other, that we can trace out the stages by which structures have changed slowly one into the other, and by which types have also changed one into the other.

—*Amer. Museum Journal.*

Young chimpanzee which has a short face and an exceedingly large forehead much like that of a young child (see skulls, page 124). (Photographed by Herbert Lang on the American Museum Expedition to the Belgian Congo.)

The monkeys and apes are relics of the middle periods of the age of Mam-

mals, and we know from the fossil remains that they have changed but little during that period. A possible reason is that most of them have continued to live in the forests and have therefore kept their primitive tree-living habits unchanged, while only a few, such as the baboons and the early predecessors of man, have left the forests and taken up wholly new habits on the plains, so that under the pressure of new conditions of life they have changed profoundly. But although other factors may be involved in the final answer to the question why all the monkeys have not evolved into men, it is true that by saving these relics of long past ages Nature has provided us with materials for elucidating the evolutionary history of human structures.

In considering the evolution of the human face, we gain a better perspective by beginning with the lowest animals and working upward. It seems that in the course of evolution the oldest part of the face is the mouth. The primary business of the face, in fact, is to direct the mouth toward the food. Some of the lowest, one-celled animals show this first essential of a face, which leads into a cavity that serves as a stomach, and among the anemones and corals and their relatives we find a well-developed mouth, surrounded by sensory organs (tentacles).

The flatworms show the presence of eyes in a very primitive condition—another structure which goes to make up the face of higher types; that is, there is a concentration of nervous tissue sensitive to light at one end of the animal, which is shaped so as to progress in a forward direction, with the beginnings of a head and of a tail. In *Peripatus,* a wormlike animal, there are little tubercles on the skin equipped with hooks which help to pull the food into the mouth, and a number of paired limb-like appendages on each side behind the mouth. These appendages become of importance in insects and crustaceans, those at the front end of the series becoming modified into sensory structures and also in many cases serving to get food and convey it to the mouth.

In some insects the tough skin which covers these appendages has been modified into a sawlike edge, and here we have a suggestion of jaws, which are the next great element to be added to the face.

Finally, we see in many ordinary insects, such as a grasshopper, a rather high type of face for this grade of animal. It is completely armored on the surface with a tough skin. In many lower types of vertebrates also the head is armor-plated like the rest of the body so that the head is protected by a helmet and the body by a cuirass. Insects naturally evolved a kind of face with a number of the characteristics of the face of higher animals, because some sort of face involving a mouth and jaws and paired sense organs is necessary at the front end of any animal that goes after its food in a fore-and-aft direction.

The very ancient fishlike vertebrates of the Silurian and Devonian ages also had a head covered with a bony skin which formed a cuirass and a helmet, and in some (*Bothriolepis,* etc.) the eyes were on top of this helmet much as they are in the grasshopper. The jaw parts of this vertebrate are likewise made up of bony plates on the surface, and no doubt the muscles pulled these jawlike plates back and forth much as they do in the insects. I do not mean that this fishlike animal with its grasshopper-like face has been evolved from the insect plan of organization; I am merely suggesting that general resemblances of this sort are frequently evolved in widely different groups in response to similar functional needs.

It is not until we reach the sharks, which are the most normal and typical of the fishlike vertebrates, that we see the vertebrate face in its typical form and that we see all the elements which are characteristic of the face of mammals. Even the familiar landmarks of the human face are all present. We have the nostrils, which are only indefinitely foreshadowed in earlier types;

we have the eyes, the mouth, the tongue, and the lips. But in the shark the whole face is covered with a tough skin.

In certain sharks (*Chlamydoselachus*) we see a suggestion as to how the teeth were formed in higher vertebrates. The tough skin, covering the head and body, is everywhere thickly studded with minute teeth, or denticles, the whole forming the shagreen of commerce. Now the teeth in the shark's mouth are nothing but enlarged shagreen denticles. At the sides of the mouth the denticles gradually become larger and the skin that bears them becomes drawn over the margins and on to the inner side of the jaws. I need hardly say that the evolution of the teeth of vertebrates has had a great influence upon the evolution of the face.

In the shark the face is very distinctly the directing part of the animal, at the front end of the backbone. We may say that all the elaborate locomotive organs (the backbone, the fins, and the muscles which move them) exist chiefly for the purpose of bringing the mouth into contact with the food, and that the higher elements of the face, namely, the eyes and the nose, exist for the purpose of directing the locomotive apparatus toward the prey. In order to consume the food and transform its potential energy into action, the shark must of course have oxygen, which among fishes is extracted by the blood from the water surrounding the gills. These gills are supported by cartilaginous arches which are of the greatest importance in the later evolution of the face, since there is good evidence tending to show that the upper and lower halves of one of these gill arches actually gave rise to the upper and lower jaws of the sharks, which are equivalent to the cartilaginous core of the upper and lower jaws of all the vertebrates above the sharks.

—*Amer. Museum Journal.*

In sharks we see for the first time the vertebrate face in typical form, with all the elements of the face of man—mouth, tongue, and lips to be brought into contact with the food by the locomotive organs, and nostrils and eyes to direct the locomotive organs. In the frilled shark (*Chlamydoselachus*) figured we see a suggestion of how teeth were formed in the higher vertebrates. The teeth within the shark's mouth are enlarged shagreen denticles such as grow on the skin outside the mouth. (After Garman.)

The fishes called "ganoids," of many different varieties, show a shiny surface armature covering the face, as also the body, recalling the insects with their hard outer shell. But the noteworthy thing about this ganoid sort of face is that the hard covering of the face and

jaws has a bony substratum which completely invests the primary underlying brain-case and the primary or gill-arch jaws. This bony skin even extends inward along the roof of the mouth, forming the primitive hard palate, and along the inner as well as the outer side of the primary lower jaw, forming the sheathing bones of the jaw, which are typical of fishes and higher vertebrates. In this early stage of vertebrate evolution this bony mask lies fully on the inner and outer surfaces, but in the later evolutionary stages of all classes of vertebrates, these sheathing bones gradually sink below the surface in proportion as a new layer of skin is generated on *their* surfaces, and as this new surface layer becomes thicker the original sheathing bones finally come to be buried deeply under the skin and often tightly appressed to the still deeper primary brain-case and primary jaws.

There have come down to us from the age of Reptiles a great many fossil reptiles and amphibians which show this shell of bone still on the surface or very near the surface. Even in the modern alligators and crocodiles and turtles the bony mask lies immediately below the tough skin.

An aggressive-looking amphibian (*Cacops*) from the Permian of Texas has the general type of face which was destined to give rise by diverse modifications to the characteristic faces of reptiles, and indirectly to those of the higher types. It still has the mask of bone. It has a special interest, besides, since it possessed another very important structure in higher vertebrates—namely, an ear-drum, which was doubtless stretched upon the bony rim behind the eye-sockets.

The Teju lizard represents a still higher grade of organization, the next step toward the mammals in one direction and toward the birds in another. It is an active, carnivorous animal, and its face is well protected by a mask of scaly skin. The bony mask is also still there, under the skin; but here is a point most important to remember, that if you took off the scaly skin of the face of this reptile, you would not find any facial muscles beneath the skin, such as are present in our own face. It is only on the under side of the jaws and throat that you would find a layer of muscles beneath the skin. In the absence of true facial muscles all reptiles are inferior in rank to the mammals, where facial muscles first appear. Birds have the immobile non-muscular face of reptiles, further masked by a horny beak or bill; but the mammals have soft muscular lips and a muscular layer about the nose, eyes, forehead, and ears.

One of the greatest gaps in the whole record of the evolution of the face consists in this, that in spite of the relative abundance of living relics that preserve successive stages in the evolution of the skull itself, there is no animal known which has an intermediate type of face between the immobile non-muscular face of reptiles and the mobile muscular face of mammals. In spite of this, comparative anatomy furnishes fairly clear evidence as to the exact process by which the one did evolve into the other.

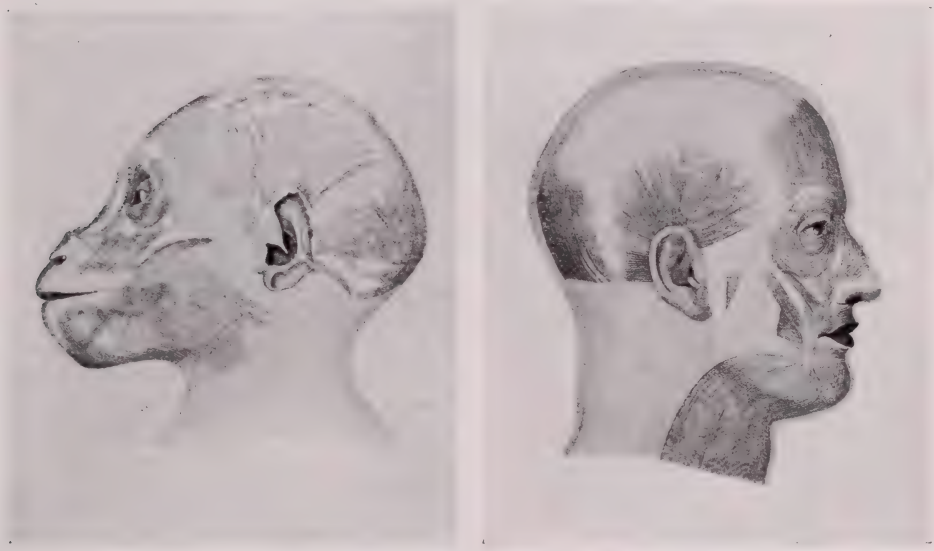
The facial muscles of a typical mammal, a lemur (*Propithecus*), for instance, correspond with the facial muscles of man. They include the platysma covering the throat, the orbicular muscle around the eye, the muscles of the nose, the muscles that lift the lip, the muscles that draw back the corners of the mouth, and the buccinator, which is of great use not only in blowing a trumpet, as its name suggests, but also in protruding the lips and pushing the food about inside the mouth.

All these various muscles of the face in man are innervated by branches of the seventh or facial nerve. The facial nerve comes out from behind the ear, and turns forward, one branch going to the platysma muscle on the surface of the throat and the other in numerous branches and sub-branches, like a vine and its divisions, passing forward to supply the muscles of the face. This fact gives the clue* to the origin of the

* Theory put forth by Ruge. This is generally accepted by anatomists as the true explanation of the origin of the facial muscles of mammals.

facial muscles. In the remote ancestors of the mammals only the platysma and the immediately underlying sphincter colli muscles were present; it is highly probable that this sheet of nerve tissue gradually spread from the under side of the throat upward and forward along the sides of the face, by degrees creeping over the old bony mask and beneath the skin, carrying with it the seventh nerve, and dividing and subdividing into numerous branches and layers; at the same time the nerve branched and branched again, as nerves have frequently been known to do when muscles became subdivided. Several analogous cases of the spread of a muscle layer into a new region are known or suspected, as in the case of the mammalian diaphragm, which is believed to have arisen in the neck region and to have migrated backward, dragging its nerves with it.

The facial muscles in man not only correspond with those in other mammals, but they also show special detailed resemblances when compared with the facial muscles of apes. Darwin and other investigators found that apes use these muscles much as we do, but with rather more emphasis than is usual in polite society. When a child first takes lessons on the piano, the teacher sometimes has to remind him or her that the piano should be played with the hands and not with the face—and sometimes it takes considerable repression on the part of the beginner to keep the facial muscles still while striving to do anything with the hands that requires intense concentration and effort. A trained chimpanzee trying very hard to thread a needle has an intent expression and very tense lips, reminding us of the familiar human trait.



—*Amer. Museum Journal.*

All mammals have facial muscles, producing a more or less mobile face. These muscles are very highly developed in man. In a comparison of Gorilla (young) and white man (adult), homologous groups are seen such as the muscles surrounding the eyes, the nasal muscles, and the muscles that lift the lip. One of the greatest gaps in the evidence of the evolution of the face is that there has been found no intermediate type between the immobile non-muscular face of reptiles and the mobile muscular face of mammals. Comparative anatomy, however, shows how one may have evolved into the other. (After Ruge.)

A gorilla in anger lifts the lips so as to expose the canine teeth and swells the muscles that run to the corners of the mouth so that they can be seen standing out on the side of the face. The arrangement of the wrinkles on the face in apes as well as in man seems to have a definite relation to the facial

The facial muscles are supplied by branches of the seventh or facial nerve, which issues from the skull behind and below the ear. It is believed that the throat muscle in remote ancestors of mammals spread upward between the bone and the skin, carrying the seventh nerve with it, and that as the muscle branched, the nerve also branched again and again, producing the highly mobile sensitive face of man. (From "Cunningham's Anatomy.")

muscles, often forming across the pull of the underlying muscles. Perhaps the principal difference between the facial muscles of man and those of apes, apart from differences in relative size, is that in man the upper lip is full and protruded while in the apes it is a thin "hard" lip, very muscular, but tightly drawn.

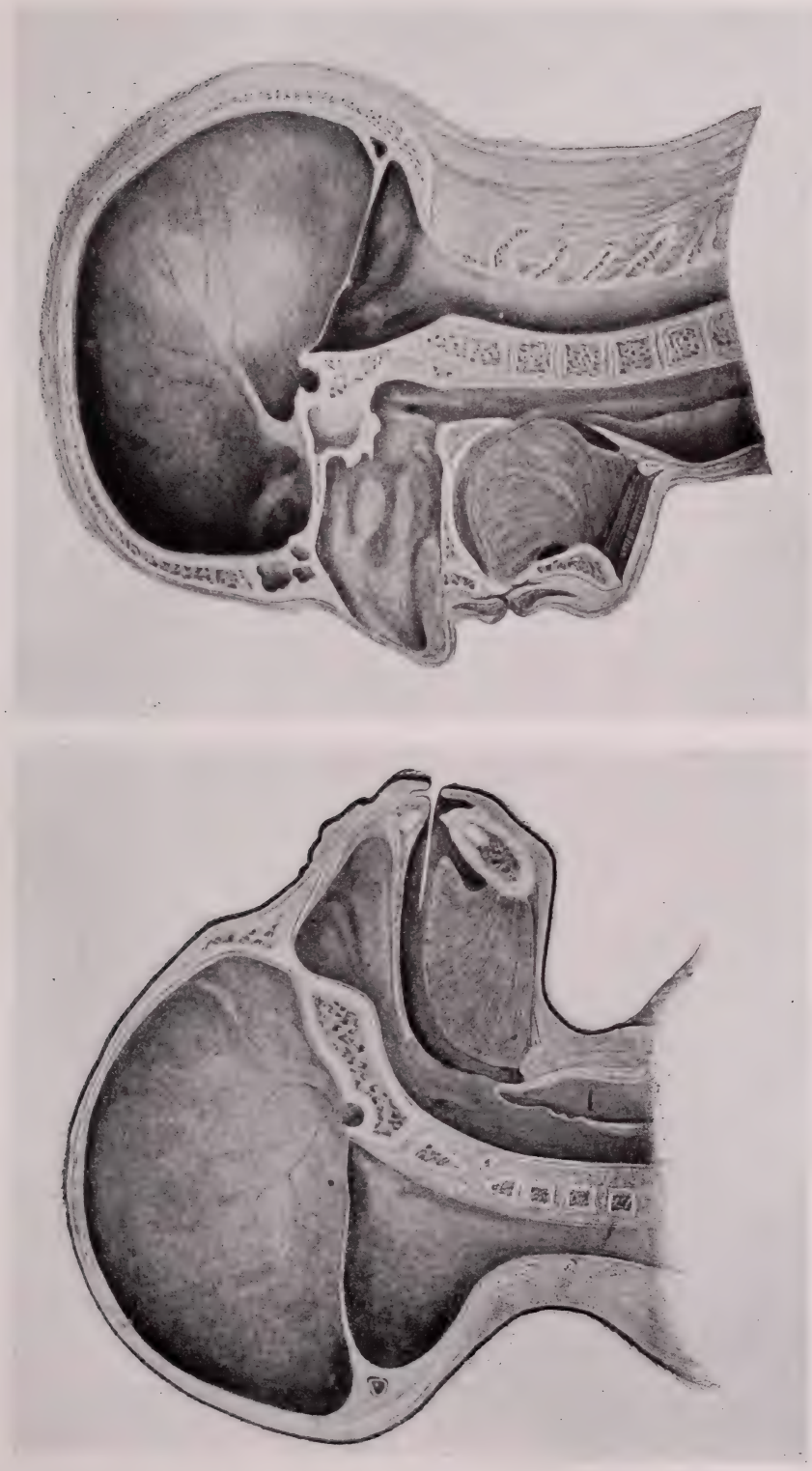
The human nose is hardly an inspiring subject from an anatomical point of view; internally it is decidedly degenerate, as compared with that of other mammals, and externally it has nothing very wonderful about it, like the nose of the elephant or those of various bats. The adult human nose, at least in the higher races, differs from that of apes chiefly in the following characters: the bridge of the nose is higher; the whole nasal cartilage is produced forward and downward, often ending below in a well-shaped tip; the nose is narrower at the base in proportion to its height, and the nostrils face downward rather than forward. Now, however important these differences may be from an esthetic point of view, they are rather small from the standpoint of evolution, the more so since the nose of the human fetus in its earlier and less differentiated stages is decidedly more apelike than human. Even in babies the nose has by no means approached its adult human form. Among living apes the gorilla makes by far the nearest approach to the human condition in the shape of its nose, although the great width and the forward facing of the nostrils give it, according to human standards, a repulsive appearance.

In the face of the Australian black man we find some primitive gorilla-like characters along with others that are typically human. The nose is excessively wide at the base and the bridge between the eyes is very low, but the nostrils point downward and the tip of the nose is distinctly human.

A wonderfully well-studied restoration* of the extinct ape-man of Java (*Pithecanthropus*) shows a very wide nose, with the nostrils facing partly forward and partly downward, and with a deep depression above the nose, between the eyes; it also has a very thin upper lip and a partly everted lower lip; so that this mingling of human and apelike characters fully carries out the "missing link" idea which is so unmistakably indicated in the excessively low forehead and high brow ridges of this celebrated relic of a pre-human stage.

---

* By Professor J. H. MacGregor of Columbia University.



BRAIN-CASE AND FACE IN APE AND MAN.

Amer. Museum Journal.

In the ape (young gorilla, at the left) the brain-case is comparatively low, and the face is shallow; in man (adult white man, at the right), the brain-case and the face are both very deep; the face has been retracted beneath the brain-case. (After Ruge.)

An interesting and grotesque caricature of certain human styles of nose is seen in two closely related genera of Asiatic monkeys, the "retroussé-nosed monkey" (*Rhinopithecus*) and the "proboscis monkey" (*Nasalis*). The former has the nose turned up at the tip and the nostrils facing forward, somewhat after the manner of a human fetus, while the male proboscis monkey, as its name indicates, has its nose produced into a long downwardly directed tube with the nostrils facing downward. In the mandrill the inflated nose is made more striking to the eye by the additional feature of intensely blue and red pigments.

It has long been suspected that these variations of the nose in the higher Primates, including man, may have been brought about through sexual selection, and that the form of nose has been determined by its decorative value, in accordance with the varied standards of beauty in the different races. Certain modern investigators, however, deny the potency of sexual selection to produce such results. Those who prefer to believe that differences in form are associated with differences in habit would perhaps favor the suggestion* that the downwardly pointing and hooded nostrils of man are primarily adapted to hunting habits and an upright gait, while the forwardly facing and open nostrils of the apes were adapted to frugivorous habits and a stooping gait. It may be also that the covered nostrils were better adapted for the rigorous, arid climate of the open plains, which according to my own view constituted the earliest habitat of men after they had abandoned their ancestral home in the forests.

Passing to a consideration of the origin of the human eyes, we find in the Primates many intergradations from the condition where the eyes are more lateral in position, to the anthropoid and human condition, in which the eyes are shifted together near the mid-line in front and can both be focused on an object near-by in front of the face. This process of bringing the opposite eyes near each other has been carried even farther in the orang-utan than in man, so that the bony partition between the eyes in the orang is excessively narrow.

The eyes of all the anthropoids are very human in character, but especially those of the young gorilla. The back of the eye of the chimpanzee as viewed through an ophthalmoscope,* is extremely human in appearance, much more than that of the orang, so that this human character of the chimpanzee eye extends even to the arrangement of the bloodvessels and the appearance of the pigmented areas.

As everyone knows, the forehead of adult male apes is very low as compared with that of normal men; but the young, both of men and apes, have a swelling forehead. The baby orang-utan shows the domelike forehead of the human infant, and the young chimpanzee† has an exceedingly large forehead much like that of a young child. The inference has accordingly been drawn by some authors that the common ancestor of apes and men did not have a sharply retreating forehead but a domelike one and a relatively very large brain-case. Although space is lacking to discuss this question, I may be permitted to record my conviction that this inference is quite wrong, and that the human race has been derived from large, powerful apelike forms with heavy jaws, massive jaw muscles and a sharply retreating forehead.

The evolution of the human forehead is well suggested if we examine a series of skulls. In an adult chimpanzee skull the forehead is very low and there are heavy ridges over the eyes. In the skull of an Australian black man also the forehead is low and there are well-defined brow ridges. In a modern European skull the forehead is high and the brow ridges are lacking. In the shape of the forehead the extinct ape-man of Java

* Dr. George F. Stevens (*in litteris*).

* According to the beautiful color plates of Dr. Lindsey Johnson. The gorilla is not figured among them.

† See illustration from photograph on page 115.

was almost exactly intermediate between the chimpanzee and the lowest known human forehead, that of the Neanderthal race of the Old Stone age. The brain-case accordingly has progressively deepened in its vertical diameter as we pass upward from an apelike stage.

These changes in the contour of the brain-case merely reflect the more fundamental changes in the form of the brain, which in the higher types becomes excessively voluminous, and as it were presses out the forehead and skull top in all directions so that in short-headed races of men the head becomes almost spherical in form.

Every part of the bony face of Primates has no doubt been molded in the long run by the action of the facial muscles that press upon it. The partition of bone behind the eyes, for example, has grown downward and outward between the eye and its muscles which lie in front of it, and the powerful jaw muscle (temporal) lying behind it. The cheek bone has been deepened to give a strong support for the outer jaw muscle (masseter). The nasal bones have perhaps been molded to some extent by the muscles on each side of them.

In comparing men and apes one of the greatest differences is seen in the form of the front part of the upper jaw, which is associated with the marked differences in the form of the lips already alluded to, and with certain no less important differences in the character of the teeth and in the movement of the lower jaw. It seems very well established that as the primitive ape-men passed from the semi-erect to the fully erect posture, and as the rapidly expanding brain-case became balanced at the top of the progressively up-tilted backbone, the whole front part of the jaws and lips was drawn backward beneath the overgrowing front part of the brain-case; meanwhile the lower jaw and the whole head increased greatly in vertical height, but shortened equally in fore-and-aft length; the width across the brain-case increased, the sockets of the lower jaw moved apart, and the opposite halves of the jaws became sharply inclined toward each other, so that the front teeth were all drawn backward; the palate and the lower jaw were thus shortened, and the dental arches assumed an archlike curve, the crowding of the front part of the jaw being partly associated with the marked reduction in size of the canine and premolar teeth.

A multitude of minor changes and readjustments took place at this critical time, but they were nearly all the direct result of the general tendency to shorten the face and draw it inward beneath the overgrowing, forward expansion of the brain-case. Among other important consequences of this general retreat of the face and its bony substructure were the downward and outward growth of the nose and the forward growth of the chin.

The evolution of the chin has given rise to an extensive literature. Some writers ascribe its existence to the excessive development of the genioglossus muscle, which runs from the hinder surface of the chin into the lower part of the tongue and which throws the tongue into the rapidly shifting positions assumed in articulate speech. Other writers ascribe the outgrowth of the bony chin to the withdrawal backward of the dental arch, to the increased pressure in the chin region, and to the turning outward of the lower rim of the jaw. Others regard the chin, like the nose, as a direct outgrowth, of no great functional importance, but linked in some way with the progressive improvement, according to human standards, in the appearance of the whole face. The present writer has sought to connect all these changes, including the reduction in size of the canines and bicuspids, with a profound change of food habits from the omnivorous-frugivorous habits of forest-living apes to the predatory carnivorous habits of plains-living men.

The profound disturbances and readjustments in the brain, brain-case, and face were accompanied by equally far-reaching changes in the backbone and in the pelvis and in the bones and muscles of the limbs. The forearms, no longer used in the stooping posture, shortened,

—*Amer. Museum Journal.*

SKULLS OF HUMAN INFANT (ABOVE) AND YOUNG CHIMPANZEE (BELOW).

The elements of the human skull are homologous with those of the ape, the differences between the two arising from the great expansion of the brain and the deepening and shortening of the face in man.

while the legs rapidly lengthened, so that men very early became fast runners on the open plains.

In conclusion, if we compare the skull of a young anthropoid ape with that of a young human being we shall find that every bone in the ape skull may readily be identified in a slightly different form in the human skull; the number and kinds of teeth are the same, both in the milk and permanent dentitions, and even the crown-patterns of the molar and bicuspid teeth are fundamentally similar in primitive apes and men. In spite of all the readjustments following the assumption of the fully upright gait and the change in food habits, the differences between the primitive ape skull and the human skull are essentially differences of proportion and of degree rather than of kind.

From the paleontological viewpoint these numerous and fundamental resemblances can only mean that living apes and men have evolved from a remote and as yet undiscovered common ancestor that lived perhaps in the middle period of the age of Mammals. I believe also that the living apes, because they have stayed in the ancestral habitat, have retained the greater part of the ancestral man-ape characters, and that the ancestral pattern of the human face may still be seen in a little-changed state in the faces of young female gorillas and chimpanzees.

The Aims of the Subsection of Plastic and Oral Surgery.

By VILRAY P. BLAIR, Major M.R.C., U. S. A.,

IN CHARGE OF THE SUBSECTION OF PLASTIC AND ORAL SURGERY, SECTION OF SURGERY OF THE HEAD, OFFICE OF THE SURGEON-GENERAL OF THE ARMY, WASHINGTON, D. C.

(Presented before the Clinical Congress of Surgeons of North America, Chicago, Ill., October 24, 1917.)

OF not uncommon occurrence in the present war are those distressing wounds of the face and jaw which have attracted particular attention, not only on account of the disfigurement which they cause, but even more so from the difficulty that was at first encountered in dealing with them. This difficulty is the logical outcome of an attitude that regarded dentistry and surgery as two distinct and separate professions. As long as this theory was allowed to dominate practice, a man who had an extensive injury of the face and jaw-bone had about as much chance for an ideal result as had the man with an open fracture of a limb in the days when the physician and the bone-setter could find no common ground upon which to meet. The bone-setter, and the physician who refused to recognize the surgeon, are of the past, but the surgeon and the dentist in their relation to each other only too frequently perpetuate the agnosticism of those older practitioners.

It is now accepted as axiomatic that in dealing with an open fracture of the thigh, the fixation of the bones and the treatment of exposed tissues should be concurrent, and that early treatment is one of the most important factors. It is not universally recognized that these same principles hold in the treatment of a wound involving the jaw-bone and the soft tissues, whether it be the result of an industrial accident, a removal of a tumor, or a war injury.

The surgeon has expended much study

upon making himself master of the various means of splinting an injured limb, but proper fixation of a fractured jaw can only be done by the use of dental splints. These he cannot apply himself, and he has not always sought the help that the dentist could so easily lend.

The late Von Langenbeck, after the war of 1870–71, said, "I would not care to go through another campaign without the help of skilled technicians to aid in the care of these jaw injuries."

The surgeon is not technically trained to splint these cases, yet early proper fixation is one of the most important points of the treatment. The dentist as such is not trained to care for the wounded tissues beyond fixation of the bones, yet repair of the soft tissues and proper drainage may be equally important. A few have bridged this no-man's land between surgery and dentistry, recently a much larger number have learned cooperation, but today I believe that the majority are pursuing their separate ways; that a patient with a jaw injury will be treated either by a surgeon or a dentist, neither of whom is master of all of the problems, and that either the fixation or the care of the tissues will suffer accordingly. Of the two, the dentist is the one more likely to recognize his need of help.

I crave pardon for injecting a personal note to the extent of begging that nothing be interpreted as the slightest criticism of the men who have been doing this work in the present war. We have a grave problem, and we must analyze the circumstances with which we have to deal. Anyone who is familiar with the results that have been obtained by Kazanjian, Hayes, Davenport, Morestin, Valadier, and the other men who have been doing this work abroad, can have but one opinion of what has been accomplished, but these men have now been engaged in this work for one or more years, while we have not yet started.

It is or has been the custom to transport these cases back to special centers where qualified men were stationed. In the meantime the patients receive what might for want of a better term be called general treatment. We have recently been told by Crile that the most important step in the preparation for the care of our wounded is to plan to give them the proper operative treatment within the first twelve hours; that if this be done, primary union may be obtained in 90 per cent., and that gas gangrene, etc., may by this means be eliminated. This may be too much to expect literally of mouth injuries, but I feel absolutely certain that in over 90 per cent. of these cases earlier treatment would accomplish even better results than late treatment, where reconstruction must overshadow conservation, and that Kazanjian, Morestin, and the others, could accomplish even better results in the individual cases with less effort and less distress to the patient if they could have their plan of treatment started in the earlier hours after the injury, rather than later when the wound is complicated by infection, muscular spasm, infiltration of the tistue, or scar contraction.

In the light of our past clinical observation and of what we have learned from workers abroad, it is our hope to place in every evacuation base and recovery hospital men who are familiar with the problems and technique of dealing with these face and jaw injuries, so that from the very first each of these patients will receive the best that surgery has to offer.

Where are we to get the large number of trained men to do this work on the scale as planned?

There are in this country at present a large number of men who have specialized in oral surgery. These are men of dental training, many of them with medical degrees, who have gone beyond the treatment of the teeth, to devote their attention to the peridental structures. These men understand most of the oral problems, the application of splints, etc., but as a rule are not accustomed to doing the major surgery that is required for many war injuries.

The surgical principles of treating oral and face injuries are the same as those applicable to wounds of any part of the

body. Wounds of the soft parts, if seen early before infection has occurred, may frequently be immediately repaired by suture. The wound is cleaned of all blood-clots, hemorrhage is controlled, and foreign bodies are removed; with the latter are included totally detached bone fragments. Above the lower border of the body of the mandible, local and general conditions permitting, immediate closure of the wound should be made, but all shreddy and pulpefied tissue is removed by clean excision, no attached fragments of bone being removed. If the defect is too large for simple suture, then, local and general conditions permitting, undermining of the borders may be done with provision for drainage of these pockets, or the wound is closed by flap operation. If the parotid duct is severed, provision for drainage into the mouth is made. In the neck there are two particularly notable danger zones in reference to subsequent infection: (1) The lower parts of the sub-facial spaces that lead directly into the mediastina, and (2) the immediate wound area about the ligated carotid or carotid primary branches. In the first instance the danger is that of mediastinitis, whereas in the second it is the possibility of secondary fatal hemorrhage. The blood supply, and therefore the resistance to sepsis, is not so good in the neck, and drainage may be necessary. If the deep sub-facial spaces are opened, in the deepest part of the lower end of each invaded space a small strip of gauze packing is placed. If one of the primary branches of the external carotid artery is divided, this part of the wound is packed, because sepsis here predisposes to fatal secondary hemorrhage. A wound in the trachea or larynx may be sutured, the more superficial part being packed, to furnish drainage away from the tracheal lumen. A wound of the pharynx or esophagus is sutured, and the line of union reinforced by some superimposed tissue, but the mediastinum is guarded by a light packing at the lowest part of the wound. These packs are not allowed to remain when fouled. A complete wound through the floor of the mouth, as Billroth long ago pointed out, should never be primarily sutured, on account of the danger of indurating infection and secondary hemorrhage. If the bones are involved, then the remaining portions should be splinted in their proper positions and no attached fragment removed. Every pocket, every open bone-cavity, and the lower end of every fracture line should have efficient dependent drainage. If this be done early, it is surprising to note the conservation and regeneration that may result. After the bony fixation and drainage have been provided for, then the soft parts may be repaired as outlined above. The necessity for late repairs will largely be in inverse ratio to the early care that the case has received.

It is by associating the capable general surgeon with the dental oral surgeon and sending them out as units that we propose to furnish this skill in multiple. If any apology were needed for this plan it is to be found in the recent report in a lay journal by Dr. W. W. Keen of the operation performed upon the late President Cleveland, in which one maxilla was removed and replaced by a prosthesis so perfect as to defy detection. This was an example of co-operation of the surgeon and the dentist.

In order to correlate the work and to present the special war problems, short-course schools have been established by the Surgeon-general in several cities where these surgeons and the dental oral surgeons working together will be molded into working units. Until their services are needed abroad these units are co-operating with the dental surgeons in the cantonments in an attempt to eradicate peridental infections from the mouths of our soldiers. It is hoped by this to materially lessen the medical casualties on the other side.

These are the aims of the subsection of Plastic and Oral Surgery in the program of "preparedness."

Dental Bibliography: The Need of an Index of Periodical Literature.

By L. PIERCE ANTHONY, D.D.S., Philadelphia, Pa.

As soon as there had been published a sufficient amount of literature pertaining to dental subjects to constitute what might be termed a literature of dentistry as a special branch of the healing art, those interested in the literature of this specialty began to make definite efforts toward the compilation of bibliographical records of dental literature.

As early as 1793 there was published in Leipzig in *Neues Magazin für Aerzte* a list of the dental works that had been published up to that time. The next effort appeared in 1829, as an appendix to Fitch's "System of Dental Surgery," published in New York, and constituted a fairly complete list of dental books published in the United States. Following that and previous to 1851 several other lists of dental books were published, notably those by Maury, of France; Linderer and Carabelli, of Germany, and Goddard, of the United States. In 1851 there was published by Robert Arthur, in the *American Journal of Dental Science,* as a "Report on American Dental Literature" to the American Academy of Dental Science, a fairly comprehensive list of dental works published in America previous to that year.

There was then a lapse of some fifteen years before any other dental bibliographer attempted to make a record of the dental literature. In 1876 Dexter published his "History of Dental and Oral Science in America," and in this was included a list of dental publications, which was, however, very incomplete; his effort being more in the nature of a review of the most important dental works published in English, together with a record of the periodicals then published, with no particular effort at giving a complete record of the periodical literature.

In 1885 there appeared the most conspicuous effort at dental bibliography yet undertaken in America, in the publication of Crowley's "Dental Bibliography," a remarkably accurate record of the dental literature of the world, covering the period from 1536 to 1885. This today is a classic in American dental bibliographical work, and is the most authentic record we have of dental literature up to and including the year 1885.

The next most notable effort in dental bibliography was that in 1891 by Sternfeld, who published a work of excellent value, and one which ranks with Crowley's as a remarkably faithful record of the dental literature which had appeared up to and including the year of its publication.

In 1886 Taft's "Index of Dental Literature" was published, and was a fairly complete record of the periodical literature of the United States up to that time, and compiled almost entirely from the literature that was familiar to the author in his career as student, practitioner, teacher, and editor.

It was, however, left for Port, a German bibliographer, to publish the most elaborate record of periodical dental literature yet attempted. Port's work began in 1910, and the first volume included the literature, both books and periodicals, from the beginning of dental literature until 1902. This index was published in separate volumes for each year up to 1907, but we understand that further effort in the direction of bringing this bibliography up to date has been

suspended on account of the war conditions at present existing.

The two most notable efforts at the publication of monthly indexes including both book and periodical literature are those by Lamb, published in the DENTAL COSMOS from March 1889 to December 1902, and Paul de Terra, published in *Archiv für Zahnheilkunde* for the years 1911, 1912, and 1913.

Lamb's index was a fairly complete monthly record of book and periodical literature of the time. Paul de Terra's work, however, was more elaborate, and was a remarkably complete record of the monthly literature of the world, including the literature of almost all languages and countries of the world.

David, a French bibliographer, published in 1889 a very accurate bibliographical record of French literature, but did not include in this any dental works published in other languages.

The most recent dental bibliographical record in America comes from the Surgeon-general's office in Washington, and is a splendid historical record of the dental books and periodicals published in all countries, but is unfortunately incomplete in that it only records the publications that are on file in the Surgeon-general's Library.

In the foregoing the writer has only attempted to give a brief history of the efforts at dental bibliography in the past as a matter of historical interest and record.

We shall devote the remainder of this article to an attempt to impress upon the reader the necessity for renewed activity in the bibliographical field, and cite some of the many apparent reasons why such records of our literature are more necessary and important today than ever in the history of our profession, in an endeavor to stimulate a more lively interest in this subject than has been exhibited in recent years by those most vitally interested in the educational development of dentistry.

The literature of a profession is the permanent historical record of its progress and advancement, and every member of that profession should be sufficiently interested in his own advancement and progress to keep abreast of the progress made by his professional *confrères*. There is only one way in which the dentist can keep in touch with the advancement of his profession, and that is by constant reading of the periodical literature in which is recorded from month to month the latest improvements and suggestions in the various methods of dental procedure. As a previous writer on this subject aptly expressed it, "The periodical literature of dentistry is a serial story, an ever-unfolding record of dental achievement. Each instalment, whether it be a copy of a journal, a book, a pamphlet, or a report, adds its 'incidents' to the main trend of the story."

The dental profession has long borne the stigma of being a non-reading profession, and we regret to have to admit that in the past there has been a certain degree of justification for such a charge, but with the ever-increasing responsibilities to humanity that are devolving upon the profession because of the widening of the scope of dentistry, it is coming to be clearly recognized that we can ill afford to allow such a stigma to continue to rest upon the profession.

Dentistry has developed with such giant strides in recent years that it has become necessary for a division of the profession into numerous sub-specialties until today we have as specialties of dentistry orthodontia, prosthodontia, exodontia, periodontia, radiodontia, oral surgery, and even further specialization in particular operative procedures.

Coincident with this broadening development of dentistry has been the development of the literature pertaining to each of the specialties, and consequently an increasing necessity for the specialist to keep abreast of the advancement in his own specialty as well as to keep himself familiar with the advancement of other specialties in their relationship to his own. In addition to this we have devolving upon dentistry larger responsibilities that have been forced upon it by the important rôles that oral sepsis and oral infections play in general systemic disturbances.

The claim has been made with some justification that the reason why dentists do not read more is that they are too busy in their practice and are too tired and mentally exhausted when their day's work is done to devote any considerable amount of time and energy to study, but in this respect we have the peculiarly anomalous condition that the busier the dentist the more important and necessary it is that he should study and read for his own benefit in the way of learning improved and possibly shorter methods as well as for the benefit of the larger percentage of the community that he serves.

The literature of the profession and its specialties has become so extensive that few busy dentists can afford the time to wade through the mass of matter published monthly to sift out that which is most important to the special reader. It is for this reason that we believe the time has arrived for a definite and permanent effort to be made to publish a monthly index of dental literature that will serve as an intelligent directive guide to the busy dental practitioner with limited time available for study.

Recognizing the need for such an index, the National Institute of Dental Teachers some years ago inaugurated a movement which resulted in the establishment of the Dental Index Bureau to devise ways and means of publishing a monthly index of dental periodical literature. The Bureau proposed to publish a monthly index of, say, six journals on the Dewey decimal system of index classification as adapted to dentistry by Dr. Arthur D. Black, but thus far there have been no material developments from the project.

The Dewey index system is undoubtedly the most comprehensive system of indexing in existence today, but the writer believes that it is too elaborate for practical application to the purpose indicated. We are of the opinion that a classified subject index after the plan adopted by De Terra, or the *American Medical Association Journal's* "Quarterly Cumulative Index of Medical Literature" would be of as much value, and possibly more, to dental readers generally than an index based on the Dewey system, and would certainly involve less labor and expense in its production.

It is not practicable or even desirable that every dentist subscribe for and read every dental journal published, but with the aid of a monthly index he could read special articles in many journals, and if he desires to read more extensively on any given subject there are today very complete dental libraries in nearly every section of the country that are accessible to dentists of the various sections.

Within the past few years—and this I may cite as concrete evidence of an awakening on the part of the profession to the importance and value of a familiarity with the existing dental literature—there have been established complete and comprehensive dental libraries at Harvard Dental School, Boston; Northwestern University Dental School, Chicago; University of Pittsburgh Dental Department; University of Pennsylvania School of Dentistry, Philadelphia; Washington University Dental School, St. Louis; Columbus Dental Society, Columbus, Ohio; the DENTAL COSMOS, Philadelphia; Academy of Medicine, New York; the Surgeon-general's Library, Washington, D. C.; Eighth District Dental Society of New York, Buffalo; the Dental Departments of the University of Michigan, Ann Arbor; University of Minnesota, Minneapolis; the University of California, San Francisco, and the University of Southern California, Los Angeles; as well as a few notable private collections. Each of these libraries, of course, is cataloged for library purposes, but for the investigator who wishes to search the literature of a particular subject the lack of any index covering the literature of that subject is an obstacle to such research that can only be overcome by diligent and necessarily indiscriminate search which consumes an amount of time that few busy dentists can afford to expend on purely literary effort. So that the value of such libraries as have just been mentioned can

only be fully realized when a subject index that will be as an "open sesame" to the valuable store of knowledge contained therein is available to all who wish to take advantage of these collections.

The writer has been associated in the collection of what he believes to be one of the most comprehensive collections of periodical dental literature in the English tongue, which has for years been accessible to all dentists in the vicinity of Philadelphia for reference reading, but very few have availed themselves of the advantages of this "mine of dental wealth untold," mainly for the reason, we believe, that it has appeared to the dental researcher as an undertaking too staggering in its immensity to attempt to search through the literature of a particular subject without the aid of an effective and practical index to guide him.

The DENTAL COSMOS Library is constantly receiving communications from dentists asking for references to a given subject, and while we are always glad to assist the applicant as much as possible, such an index as we have suggested would meet the needs of the inquirer certainly much better than could individual answers. We further believe that facilitating reference in some such manner as herein outlined would give an added impetus to more general reading on the part of the profession, and would, we hope, remove from dentistry the stigma of being a non-reading profession which it has so long borne.

BIBLIOGRAPHY.

CROWLEY. "Dental Bibliography."

STERNFELD. "Zahnarztliche Bücherkunde."

TAFT. "Index of Dental Literature."

DEXTER. "History of Dental and Oral Science in America."

PORT. "Dental Bibliography."

DE TERRA. "Index Stomatologicus."

American Journal of Dental Science. 1882.

FITCH. "System of Dental Surgery."

VAN TESLAAR. "The Dentist's Attitude Toward Professional Literature," DENTAL COSMOS, 1912.

"Index Surgeon-general's Library," 1889. 1907.

WEINBURGER. "The History of Dentistry and Dental Bibliography as a Subject of Teaching and Research," etc., DENTAL COSMOS, 1917.

211 SOUTH 12TH ST.

A Case of Nasal and Palatal Restoration.

By GEORGE G. BELL, D.D.S., Ashland, Ky.

THE patient, Miss G——, having an acquired cleft palate and loss of nose, was sent to me by a charitable institution. A cast of the face was made after inserting a tube in the opening left by the lack of nose tissue, with soft plaster poured over the entire face, which was previously greased with cocoa butter. A matrix of stiff cardboard, passing under the chin and forward of the ears, was used in making the cast, the assistant holding the cardboard matrix while the plaster was being poured. A model was then run, and a nose was made from pink wax and tried on the patient. A compound impression was taken of the mouth, and from this impression a model was made of wax, chilled, and placed in the mouth. A Gilmore attachment was used in the obturator and the wire left in

place when it was vulcanized. This wire was later removed, and in fitting the nose a new wire was placed in the attachment on the obturator and allowed to pass into the nose. When the nose was vulcanized, the wire was vulcanized in it. A small hook was placed at the upper part of the nose to engage a pair of glasses that held the nasal restoration in place. The accompanying illustrations show the case before and after treatment, and the finished artificial restoration.

Fig. 1.

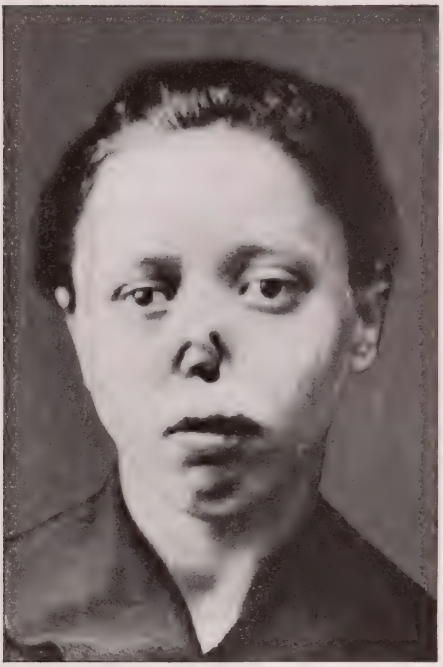
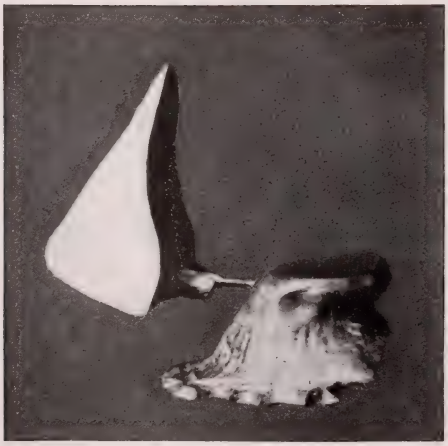


Fig. 2.

Fig. 3.



An Experimental and Clinical Study of the Isolated Thyroid Hormone.

By NELSON W. JANNEY, M.D., Ph.D., New York, N. Y.,
ASSISTANT PROFESSOR OF MEDICINE, NEW YORK POSTGRADUATE MEDICAL SCHOOL AND HOSPITAL.

Address delivered before the annual meeting of the Eastern Association of Graduates of the Angle School of Orthodontia, New York, N. Y., May 7, 1917.

Mr. President, Ladies and Gentlemen:

I FEEL in coming to you from another field of research, in which I have spent years of my life, that we have much in common. Let us look at these studies as brothers in endeavor should.

In presenting the work this evening I have thought that it would seem a little one-sided if I confined my talk entirely to a report of our investigations on the thyroid gland and its hormone. It would make it somewhat broader to speak a little more generally about the ductless glands, and perhaps of some new viewpoints in regard to the function of these organs.

When we come into the realm of hormone therapy we have at once one of the most fascinating sides of medicine, but unfortunately one of the most confusing, presenting perhaps more difficulties than any other in this field of work. The causes for this are quite obvious, but I might take merely a minute to recall them to your mind. The ductless glands are often very unfavorably situated anatomically, as you know, and therefore can become available to research only after overcoming great obstacles. Take, for example, the pituitary, which is situated at the base of the cranium. Aside from the location, I may allude to an added difficulty in the fact that, with very few exceptions, these hormones are not stored in the ductless glands, but are constantly given out into the circulation. Again, certain endocrine glands, such as the parathyroids, bodies necessary for life, are very small. I removed some recently from a dog, and the entire amount did not weigh more than one-tenth of a gram.

The amount of hormone in these ductless glands is also extremely small. I have made calculations recently which indicated that there are no more than about 40 mgm. of the hormone present at any one time in the thyroid. The chemical difficulties presented in isolating this very small amount of substance are enormous. When we consider the parathyroid glands, and think how minute is the amount of hormone excreted by them, we can realize some of the obstacles which must be overcome in solving these problems.

The solution of this whole hormone question lies in chemistry. We shall never be able to make advances in hormone therapy without increased knowledge of the chemistry of the hormones.

Before we begin a consideration of our own studies, I should like to call attention to two other points, namely, the changes in the nature of the hormones during preparation; and the question of dosage of endocrine preparations. In these days, when the medical practitioners are administering all kinds of glandular extracts, we ought to appreciate the uncertainties attending this treatment as carried on at the present time. The great difficulty in obtaining

an extract which promises to represent the active principle of the gland lies in the fact that we know little about the chemical attributes of the hormones. Certain it is, however, that changes in their chemical constitution, therefore very probably in their effect on the organism, may result from the mode of their commercial preparation. As to the dosage, I may mention that in our own studies we have found that one may get two entirely opposite effects on the organism, according to the amount of thyroid gland or its preparations administered.

We know that thyroid extract administered from without is a substitute for the thyroid secretion in the cases of cretins who are without thyroids or who have diseased thyroids, but we have never until recently had in our possession the isolated thyroid hormone. Various preparations have been made from the thyroid for the past twenty-five years, and various physiological experiments carried out with them, but none have demonstrated that the actual hormone of the thyroid had been obtained.

ISOLATION OF THE THYROID HORMONE.

About 1914 Dr. E. C. Kendall of the Mayo clinic began experiments with the aim of isolating the thyroid hormone. The difficulties to be overcome were tremendous, as I stated before. Dr. Kendall has told me that he has worked up chemically about a ton of thyroid tissue to obtain five grams of approximately pure thyroid hormone. He has of late practically devoted all of his time to this problem, and I have every reason to believe that he has been generally successful. He has isolated a crystalline body from the thyroid gland which certainly presents more definite characteristics than anything yet obtained. The empirical formula of this substance is $C_{11}H_{10}O_3NI_3$, and it may be designated from its structural formula, according to Dr. Kendall's views, as tri-iodo-trihydro-oxy-indol-propionic acid. This chemical body, when pure, consists of microscopic sheaths of white crystals which are very refractive, so that quite a beautiful sheen is visible in the test tube when they are floating in it. It contains about 66 per cent. of iodin in the pure condition. The iodin contained in this represents about 50 per cent. of the total iodin of the thyroid gland. The hormone is quite soluble in water; it has a constant melting-point, and is undoubtedly a fixed chemical compound.

TOXIC ACTION OF THE THYROID HORMONE.

It now becomes necessary to prove whether or not this substance possesses the physiological characteristics which have been ascribed to the thyroid, for, after all, the physiologic and therapeutic tests are the most important.

Through Dr. Kendall's generosity I secured possession of a few hundredths of a gram of the hormone, which has been sufficient to carry on our work for over a year. Investigations at the Mayo clinic had shown that this hormone preparation had undoubtedly a therapeutic effect in myxedema and cretinism, and also produced toxic symptoms in overdose. These results were brought about by metabolic changes which urgently required investigation. Accordingly, the facilities for such studies offered by the Montefiore Hospital of this city were utilized, and metabolic studies were carried out by us in the laboratories, the animal experimentation rooms, and the metabolic ward of that institution.

Inasmuch as it was an entirely new remedy, I felt that perhaps the proper thing to do would be to begin right at the beginning, and test it as if no work had been done at all. We first took a dog and injected quite a large amount of this hormone solution subcutaneously. He showed for the first twenty-four hours practically no change, then began to develop marked symptoms of hyperthyroidism. He showed a high fever, great nervousness, very fine tremor, characteristic of Graves' disease, also great sensitiveness to touch; excepting

for the condition of the eyes, he exhibited practically all the symptoms of Graves' disease. A large dose of thyroid tablets would give precisely this clinical picture, therefore we knew that we were dealing with an active thyroid preparation. I shall show you later a slide demonstrating the effect of these thyroid injections on the dog's metabolism. As you will see, a veritable metabolic storm was the result.

Anyone who has followed clinical work knows how easy it is to be deceived by changes in the clinical picture of a case. We try one remedy after another and if the patient improves, we are tempted to come to the conclusion and write a paper showing that the patient recovered only because he followed our treatment. However, the patient *might* have gotten well without the drug. I felt that we must have a more accurate gage than merely following the clinical picture in this study. This brings us to a consideration of the effect produced on the metabolism by the thyroid gland, because a study of this effect afforded us a more accurate means of following the general changes in the patient's condition, as the chemical processes are fundamental and can be more exactly followed than clinical symptoms.

THE NITROGEN BALANCE AS A GAGE OF THE EFFECT OF THYROID PREPARATIONS.

We have long known that the thyroid acts as a stimulus to metabolic processes. In the treatment of obesity, large doses of thyroid will cause people to lose weight, such loss being accompanied by a considerable loss of nitrogen to the body. The action of the thyroid on metabolism has therefore been regarded as a stimulus to protein breakdown, or catabolism, with a consequent loss of nitrogen. This view has always seemed to me paradoxical, for the reason that we know that growth is controlled a great deal more by the thyroid than was formerly supposed, this gland having almost as much control of growth as the pituitary. Nitrogen must be gained and not lost by the growing individual, because growth entails the building up of protoplasm, and that in turn means the putting on of nitrogen. Therefore if the thyroid functionates to promote and encourage growth, its physiological action must cause retention of nitrogen. In clinical medicine, however, it has been held that when we give a patient thyroid we stimulate catabolism, and nitrogen is lost. Where, then, do we stand?

In the last year or so, through the work of Schaeffer and Hewitt in England, some extremely interesting new data were obtained. They found that if thyroid in relatively large amounts was fed to white mice no growth took place, and nitrogen was lost; but by reducing the amount of thyroid these workers finally reached a dosage which *stimulated* the growth of the animals. Nitrogen was retained in increased amounts under these circumstances. In this latter case we evidently have a true physiologic action—the *anabolic* effect of the thyroid in contradistinction to the catabolic action which was hitherto considered the only function of the thyroid.

Therefore this work really pointed out the path. We thought perhaps by studying such a mode of procedure we might find a more accurate way of measuring the effect of the thyroid in general by a study of the nitrogen metabolism. These experimental findings were accordingly applied to the human individual, and without going into any more detail than necessary, I might say that we have pretty definitely been able to prove that *when the thyroid exerts a physiologic or therapeutic effect on the organism, and not a pathologic or toxic effect, we find that nitrogen is retained in the body in increased amounts.* This finding afforded us a way of more accurately following the effect of the hormone treatment than had been heretofore possible. A metabolism ward was developed in the Montefiore Hospital with the idea of using this gage of the effect of thyroid medication. The patients were isolated in this ward, and were put on weighed diets containing known amounts of nitrogen. The excretions were exam-

ined for nitrogen, and a daily balance of the nitrogen intake and output established over long periods; then by noting how these patients were reacting, and by administering thyroid, we were able to follow with considerable accuracy its real effect on the metabolism. This was the method employed throughout our work.

EFFECT OF THE THYROID HORMONE IN THE NITROGEN BALANCE.

We then began a series of studies with the thyroid hormone. The first experiment I have already mentioned—the effect of an overdose on the dog's metabolism. Then another series of experiments was undertaken. Patients were put on the fixed diets, and the nitrogen balance determined. I might say that this balance is merely the nitrogen which goes into the body and the nitrogen which is given out by the body, subtracted one from the other; that is, if the nitrogen which is lost is greater than the nitrogen which goes into the body, the balance is negative, and *vice versa.* It may become more or less positive or negative as a result of the thyroid medication. As you will see by following the lantern slides, a good method of control had thus been established. Whenever we found that the therapeutic effect was in evidence, an increase in the positive balance was observed.

We soon found that extremely small amounts were enough to influence metabolism, and metabolism was affected (this is the point) *before the appearance of clinical symptoms.* We were never forced to give enough to produce clinical toxicity, because we could tell by our nitrogen examinations how far we dared go. We found that a very minute amount of thyroid did influence the organism. How small an amount was effective you may judge from the fact that in one or two cases a few hundredths of a milligram of hormone influenced metabolism considerably, and caused an amount of weight and nitrogen to be lost that was quite appreciable.

This effect was determined in a series of normal control subjects. I might say that these experiments required to be carried on over long periods of time. One day's nitrogen balance means very little; a week's balance means a little more, but to draw definite conclusions the balance must be followed for a long time. We tried to live up to this ideal, paying no attention to daily figures, taking the mean of all the weekly balances, and using the mean figures for comparison. Our cases were examined in this way over periods varying from three to thirty-seven weeks.

EFFECT OF THE HORMONE ON PATHOLOGIC CONDITIONS.

Graves' disease. Having completed the preliminary series of controls we felt privileged to go farther and study pathologic conditions. First we studied a series of exophthalmic goiter or Graves' disease patients. This condition has been explained for decades as one of hyper-function of the thyroid. There is an excess of thyroid metabolism. If this were true, thyroid medication would not be expected to benefit those suffering from this disease. Indeed, it should have just the opposite effect. There are, however, many objections to be made to the hyperthyroid theory of exophthalmic goiter which I cannot go into now. We felt it therefore proper to determine the effect of the thyroid hormone in Graves' disease with the aid of metabolic studies, in the hope of answering the question finally, "Does thyroid therapy avail anything in this condition?"

We subjected a number of such cases to this metabolic control—*i.e.* adding varying doses of hormone as sole medication to the carefully weighed diets, analyses being made daily. We feel that we have quite definitely determined through this work that the thyroid hormone does not benefit exophthalmic goiter. There were, indeed, some cases which showed an appreciable gain in nitrogen retention and weight, and a betterment of the clinical symptoms, but in two-thirds of the cases this did not occur. Therefore we were forced to dis-

miss the possibility of exophthalmic goiter coming under the therapeutic range of this new remedy.

Cretinism. The most interesting results yet obtained have been in the hypothyroid conditions. A case that has been under observation was one which seemed absolutely hopeless as regards treatment. A young woman of twenty-three had the mental development of a child of six, and presented all the well-known marks of cretinism. This case had been treated previously with thyroid tablets, and had been declared by an internist not to be a case of cretinism because it did not respond to thyroid treatment. As a matter of fact, this cretin then was receiving a toxic dose, and there was at that time no way of measuring its effect. From the clinical symptoms it was evident, however, that the catabolic effect was being obtained, and this cretin was losing ground, not gaining, on the very therapeutic remedy which was her only salvation. In our own experiments we felt that we should give our metabolic theory a pretty rigid control, so we did not confine ourselves to giving thyroid hormone, but also fed fresh thyroid gland. We observed that the nitrogen balance was very markedly increased when the fresh gland in proper doses was administered. Only after we had carefully studied her metabolism did we prescribe any thyroid medication. Having gained a definite idea as to her metabolism we could determine with considerable accuracy how large a thyroid dose she should have.

We found that we were dealing with much more delicate changes and dosage than had been supposed to exist in the past. As you know, the usual medical dose of compressed thyroid tablets is about five grains three times a day. We found that when we gave our patient an amount of thyroid hormone which represented half a milligram of iodin once a day, we were giving her too much; so much so that she showed toxic symptoms. First there would be a peculiar dropping off of the plus nitrogen balance. This was always the first sign to appear. Other symptoms did not develop for a week or two, then there ensued a slight attack of tachycardia and precardial distress.

As you have noted, we measure the amount of hormone in terms of the hormone iodin, which represents by weight about two-thirds of the amount of hormone present.

Then we gave our patient an amount of hormone equivalent to one-tenth of a milligram of hormone iodin. She still failed to gain. By persistence—and the labor was rather severe, as it took a great deal of laboratory work and several men's time—we found the optimal dose for this cretin to be *one-fourth of a milligram of hormone iodin daily.* This dosage as worked out could be corroborated from other clinical observations, and we found that this is about the right dose to make a cretin grow. On this dose our cretin now gained; she felt better and the nitrogen balance increased. We had now a clear explanation of her previous difficulties in the general medical wards, where she was receiving five grains of the dry extract three times a day. Upon reckoning this amount in terms of the hormone, it was determined that she was at that time receiving something like 125 per cent. more thyroid than she should have been getting, and that therefore toxic symptoms were showing themselves as I have described.

THEORIES CONCERNING THE PATHOGENESIS OF GRAVES' DISEASE.

I may now refer to a certain hypothesis which I have ventured to mention once or twice before in private as regards the possible origin of exophthalmic goiter. As is well known, exophthalmic goiter is characterized by a very strong outbreak of toxic symptoms, and the nitrogen breakdown is probably due to this toxic effect upon the protein tissues. The following is a possible chemical explanation of this toxic outbreak. We see here on the blackboard the formula for the normally occurring amino-acid histidine, terminating in the acid group, COOH. It is well known that when histidine undergoes a certain breakdown this group is broken

off, leaving what is known as B-iminazolethylamine. Histidine, unless taken in relatively large quantities, is not toxic, but this substance which is so intimately related to it is very poisonous. A minute quantity is capable of killing a guinea-pig. The point which I am trying to illustrate is that a compound normal to the body can become extremely toxic by undergoing but a relatively moderate change in its chemical constitution. I have applied this same explanation to the question of the thyroid. The thyroid hormone possesses an acid group, COOH. Were this to be split off a toxic body might be formed. The symptoms of exophthalmic goiter might be due to the circulation of a highly toxic, improperly synthesized thyroid hormone.

I shall close with a short consideration of the action of hormones in general, and of the theories that have been advanced to explain that action.

THE SPEAKER'S HYPOTHESIS OF ENDOCRINE FUNCTION.

The action of the hormones on the organism is an exceedingly intricate question. I have represented here on the blackboard in a brief, graphic way the celebrated theory advanced by Falta, Eppinger, and Rudinger, and advocated by many of the Viennese school, including Von Noorden, regarding an explanation of the interaction of the chief hormones. They believe that aside from an action which each hormone has for itself, it also has an action on other of the endocrine glands; for instance, that the thyroid exercises a depressing effect on the pancreas and a stimulating effect on the suprarenals, and that the suprarenal bodies exert a depressing effect on the pancreas, etc. They were thus enabled to account for a great many clinical observations.

Thus it has been observed in Addison's disease that the patient can ingest large quantities of sugar without a sign of sugar in the urine. This is explained by the Viennese school by the fact that the suprarenals exert a depressing effect on the pancreas normally, and when this influence is removed, there is nothing to prevent the pancreas from overacting. More sugar could consequently be burned up, and the tolerance therefore would rise, and the patient would be able to eat more sugar without having it appear in the urine.

This theory is so exceedingly elastic that almost anything can be explained by it. It is also exceedingly complex, although I have tried to present it as simply as possible in the example that I have given you.

Recently we have done a little work to test this theory experimentally. We attacked this problem from another viewpoint by a chemical investigation of the blood sugar. In a series of experiments on six or seven animals, we made the very interesting observation that when the thyroid was removed from these animals there was a large decrease in the blood-sugar values. The decrease ranged from 25 to 30 per cent. This finding apparently bore out the theory of Falta, Eppinger, and Rudinger. We suppose that the blood glucose was thus decreased because, the thyroid being removed, the pancreas was over-stimulated and that more sugar was burned. However, we determined that this was not the true explanation.

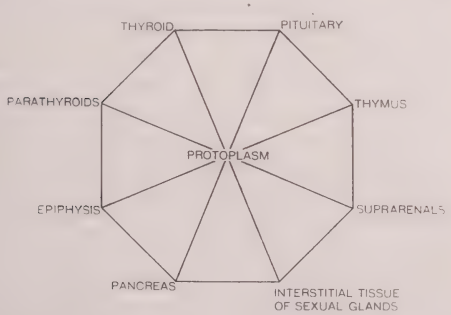
We had previously studied the blood-sugar curves of normal animals—*i.e.* the length of time that it took for the blood sugar to return to its normal value after the ingestion of a definite amount of sugar. We found that the normal level was reached in two hours after the carbohydrate was administered. On repeating these experiments after thyroidectomy, we found that it took four or five hours' time to return to normal. This was remarkable because, if the Viennese hypothesis was correct, the sugar should disappear out of the blood more quickly due to the over-stimulated pancreas, and the blood-sugar curve should be consequently shortened.

We thus observed actually a decreased ability to remove sugar from the blood after thyroidectomy. This makes it clear that we are dealing with a new phenomenon. We had discovered the reason why the tolerance for carbohydrates was apparently increased after thyroidectomy. It was not because the

pancreas could split more sugar, but because the blood-sugar level was low, and owing to this fact, though the carbohydrates could not be readily removed from the circulation, the sugar concentration never rose high enough to cause a urinary excretion of sugar. The theory of Falta, Eppinger, and Rudinger in explanation of the action of these glands is thus experimentally confuted.

If we collect data bearing on the action of the endocrine glands and the effect on the organism when certain of these glands are diseased or removed, we must come to the conclusion that many of these organs have similar functions.

In diseases of certain ductless glands it is pretty generally recognized that there exists a disturbance of other of the glands. If the pituitary is affected the thyroid is liable to be, and the suprarenals, and so on. It is certain that there is a synergistic action between the various ductless glands, and that perhaps their action on the organism, which is nothing more than the effect on protoplasm, can be represented graphically, not by the triangle of Falta, Eppinger, and Rudinger, with arrows running in both directions, but by some such scheme as an octagon in which the thyroid, the



The synergistic action of the endocrine organs. (Janney.)

parathyroids, the thymus, the pituitary, the suprarenals, the interstitial tissue in the sexual glands, the pancreas, and finally the epiphysis, occupy the corners and exert, as indicated by radii, their synergistic effect on the cell substance.

This in a crude way illustrates the ideas which I have put together regarding what seems the most logical hypothesis of endocrine action capable of being devised at present. To exemplify: If the thyroid is removed, growth does not stop entirely, the organism being able to carry out these processes to a certain extent, the thymus frequently increasing in size. Therefore in the building up of the protein molecule various glands apparently exercise similar functions.

As to how the functions are carried out we are still in the dark, but the question is being chemically studied. I am inclined to believe that it is a matter of the synthesis of the protein molecule by the action of various hormones on its component parts, the amino-acids.

Let us suppose a given amino-acid like lysin, containing six carbon atoms, is to be built up in the body of various simpler groups. It is known that substances supplied by the food usually contain not more than three carbon atoms. Let us suppose that the function of the pituitary is to link together the three carbon atom compounds into this particular amino-acid. Perhaps the thyroid has to do with the linking of lysin with other amino-acids to build a polypeptid. Another hormone may be necessary to unite various polypeptids into protein. Under normal conditions each gland has its own division of this work, but may under stress take over some of the work of others.

However, do not take this theorizing too seriously. It is at present an absolutely unproved hypothesis. There is no proved theory of the action of the ductless glands; there are a few hypotheses, and this is merely a new one. The one which has heretofore been more or less accepted—the one which I considered most logical—can no longer, as I have shown you, be regarded as satisfactory. It is perhaps better to have a new one which is reasonable than to remain helplessly at sea in this intricate field of research.

33 East 63d st.

[See also *Discussion*, as reported under "Proceedings of Societies," this issue.]

The Relationship of Oral Secretions to Dental Caries.

I. Methods of Determining the Amylolytic Index of Human Saliva.

By HERMANN PRINZ, D.D.S., M.D., Philadelphia, Pa.

From the Laboratory of Pharmacology, Evans Institute, University of Pennsylvania.

INTRODUCTION.

THE most important functions of human saliva consist in moistening the linings of the oral cavity, lubricating the food bolus, washing away the food débris, and chemically altering the insoluble starches of our foodstuffs into soluble sugars. Saliva is a digestive juice. The chemic action of saliva is primarily dependent upon the presence of certain ferments, among which amylase, and to a less extent maltase, catalase, and oxydase are the important ones. The most active ferment is amylase, commonly known as ptyalin or as diastase, which in connection with the less active maltase is principally concerned in the cleavage changes of the starches, while the functions of catalase and oxydase are as yet doubtful. The digestive action of human saliva was first discovered by Leuchs in 1831, and further investigated by Schwann. Berzelius in 1840 named the organic constituent of saliva ptyalin, and Mialhe and Cohnheim in 1865 were able to isolate this product in a comparatively pure form. The amylase of human saliva is practically identical with that obtained from vegetable sources (malt), although they differ slightly in their optimum action. Vegetable amylase is usually referred to as diastase.

GENERAL DEFINITION OF FERMENTS.

According to our present conception we may define a ferment as an organic substance produced by the living cell which, in its general behavior, is closely allied to a catalyzer, *i.e.* a substance which by its mere presence possesses the faculty of markedly increasing the velocity of chemic reactions, which as such usually occur only extremely slowly. Incidentally, during its activity the ferment is not altered, and it does not form an integral part of the final product. Apparently, ferment action is specific in its nature; that is, a ferment acts only upon a substance having a definite stereochemic configuration to which the specific ferment is adjusted, or, as Emil Fischer has most fittingly expressed it, the ferment conforms to the substratum, *i.e.* the substance to be acted upon, in a somewhat similar manner to that in which a key fits a lock. Ferments have been and to some extent are still referred to as enzymes. The latter term is employed to designate so-called unorganized ferments, *i.e.* purely chemic substances as separated from the organic "living" ferments. At present this conception is obsolete, since it is possible to separate the enzymes from the mother substances by simple powerful physical means (Buchner press). Relative to their physical nature, ferments are closely allied to colloids; however, one of the prime requisites of a colloid, *i.e.* the property of passing through animal or vegetable membranes, is not fully shared by them.

Numerous ferments are produced or

secreted by the mother cells in an inactive form. Such ferments are known as pro-ferments, or enzymes. These pro-ferments require for the exhibition of their full activity the presence of another body, *i.e.* an activator. These latter substances may be purely chemic substances, as acids, alkalis, or salts, or they may be in the nature of substances closely related to the ferments themselves, and known as co-ferments or kinases. Again, certain substances are known to check the action of ferments in a manner analogous to that in which the activator enhances their activities. These substances, being either purely chemicals or ferment-like bodies, are known as anti-bodies, anti-ferments, or paralyzers. In general it may be stated that ferment action stops as soon as the products of its own action have reached a certain concentration.

NOMENCLATURE.

Unfortunately, at present the terminology of ferments is found to be still in a somewhat chaotic condition. The various terms applied to different ferments by the older investigators, owing to the immature state of biologic knowledge, were largely arbitrary selections which may or may not have been suggested by some apparent action of the ferment, or the selected name was simply a modification of that of the substance from which they were obtained. For instance, the term diastase, which signifies a separation, was employed to indicate the principal ferment of saliva, as it possesses the power of reducing or separating sugar from starchy food. Again, the same saliva ferment is more frequently referred to as ptyalin, a name given to it by Berzelius, indicating a substance obtained from *ptyalon,* the Greek equivalent for saliva. At present, it is customary to refer to this substance in conformity with accepted modern ferment terminology as amylase, *i.e.* a ferment which reduces starch. Modern ferment nomenclature is based upon the principle of adding the suffix *ase* (from *asis,* slime or colloidal substance) to the Greek or Latin root of the substratum, which in this case is *amylum* (starch).

METHODS OF DETERMINATION.

The various analytic methods employed for the purpose of determining the amylolytic (starch-converting) power of saliva are either qualitative or quantitative in their nature, and are based on chemic or biologic reactions of the intermediate or the end products of the cleavage action of the contained ferments upon carbohydrates. The more important methods may be enumerated as follows:

That of estimating the resultant sugar by means of Fehling's solution (Lintner) or by titration (Bang).

That of estimating the quantity of reduced glycogen by polarization (Pflueger; Bang).

That of estimating the quantity of reduced starch by test plates (Mueller) or by glass tubes (Walther; Mett).

That of estimating the quantity of reduced starch by geometric rotation (Wohlgemuth).

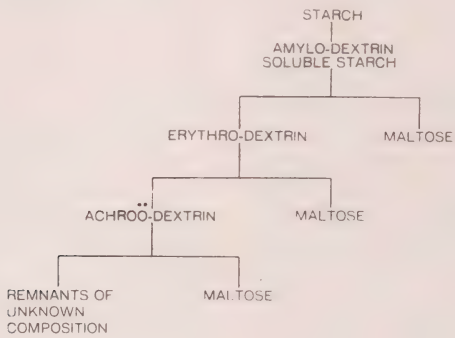
In determining the relationship of human saliva to dental caries we are interested principally, aside from numerous other questions, in the quantitative changes of the starch contents of carbohydrate foodstuffs collected about the teeth. These changes depend primarily upon the action of certain ferments present in the oral secretions; hence the importance of determining the amylolytic index of saliva. Any method which offers quick and reliable comparative results is suitable for the purpose in view. Basing our choice upon extended experimental work, we have finally selected the Wohlgemuth rotation method for this specific purpose, on account of the simplicity in regard to the apparatus employed, its reliability, and the small expenditure of time.

CLEAVAGE OF THE STARCH MOLECULE.

When complex carbohydrates, especially starches, are subjected to the influence of certain specific ferments, as

amylase, for instance, in the presence of water and a suitable temperature, a process of hydrolysis of the insoluble starch paste is inaugurated which results in the progressive formation of soluble bodies closely allied to sugar. Brown and his co-workers assume that the hydrolyzation of starch occurs in a step-like fashion and that at least eight distinct phases of this process of reduction may be observed. The complete chemic process of the cleavage of the starch molecule is by no means definitely settled; however, the presence of the products of this cleavage action may be distinctly revealed by a series of colorimetric changes brought about by the addition of certain chemicals, especially iodin, or by other chemic or physical means.

When iodin solution is added to a mixture of starch and water, an indigo-blue color is produced in the presence of hydriodic acid or an iodid, which color, while not permanent on boiling, reappears temporarily on cooling. This same color reaction is revealed by the first product of the cleavage process, *i.e.* amylo-dextrin, also known as amidulin or more commonly as soluble starch. Incidentally with this change into soluble starch, the opalescence of the starch mixture disappears. The next product within the cycle of cleavage is erythro-dextrin, which is manifested by a Bordeaux-red color in the presence of iodin, and this, in turn, is followed by achroö-dextrin, a compound which, as its name indicates, does not react colorimetrically. The final products of the starch cleavage are as yet not definitely known. With the creation of each individual lower dextrin, incidentally a certain quantity of maltose is produced. The amount of maltose progressively increases during the process of transformation of the starch into dextrins. Graphically, the various phases of the above changes may be represented by the diagram shown.



METHODS OF COLLECTING SALIVA.

Human saliva represents the mixed secretions from three pairs of salivary glands and the minute mucous glands distributed about the oral cavity. If, for specific physiologic experiments, it be desirable to obtain saliva from a single gland, it may be accomplished by introducing a sterile catheter into the opening of the respective gland duct (Astaschewsky), or the saliva may be collected by means of an apparatus known as a segregator (Pickerill), or it may be pumped out of the gland by means of a suction cup (Howe).

For the purpose of determining the amylolytic action of the mixed saliva it is essential to obtain the combined secretions of the oral glands in the resting stage of digestion. Hoppe-Seyler's method of collecting the mixed fluid from the mouth is best adapted for such purposes. Artificial teeth, if any, should be removed, and the patient directed to wash out the mouth thoroughly with water. After the lapse of about a minute the patient is instructed to bend his

head forward and open his mouth wide so as to allow the saliva to drip into a clean glass. To facilitate the flow of saliva, masticating movements with the jaws are usually helpful. The chewing of paraffin, rubber, etc., or other forms of stimulation, as the vapor of acetic acid, ether, etc., are to be avoided. No sucking motion should be employed, as this may tinge the saliva with blood, which materially alters the amylolytic power of its amylase content. The normal adult healthy individual produces during waking hours approximately 1 cc. of saliva per minute. This quantity, however, varies greatly, depending upon chemical, mechanical, electrical, thermal, and psychical impulses in the form of stimuli, and upon individual characteristics of the patient.

Saliva is a digestive juice secreted by the oral glands. The secretory functions of the glands adapt themselves to the nature of the various stimuli (mastication, foodstuffs, and psychic impulses), and consequently the respective chemical composition of saliva depends primarily upon the nature of these stimuli. Saliva which is collected for the specific experimental work under consideration should be obtained during the resting stage of the glands, *i.e.* about three hours after mealtime and never before breakfast. These requirements are in harmony with the usual methods employed in obtaining gastric juice for chemical analysis.

PROBLEMS OF INVESTIGATION.

The problem which confronts the investigator may be stated as follows: How many cubic centimeters of a 1 per cent. starch solution are reduced to sugar by 1 cc. of a given ferment solution at a specific temperature within a definite period of time? The obtained results may be defined as the amylolytic index of the ferment solution under consideration, and may be expressed by the letters A I. The substratum (starch solution) may be represented by the letter S, and the ferment solution by the letter F. To obtain the amylolytic index, the quantity of the substratum has to be divided by the quantity of the ferment solution, which, expressed as a symbolic formula, reads:

$$\frac{S}{F} = AI$$

Incidentally, the exact temperature expressed in degrees C., and the exact period of time necessary to accomplish the reaction, expressed in minutes, is noted. The temperature most suitable for developing the optimum activity of human saliva is, naturally, body temperature; *i.e.* 38° C., while the standard of time required to bring about the amylolytic change in 5 cc. of a 1 per cent. starch solution may be fixed at 20 minutes. Consequently, the amylolytic index may be expressed by the following equation:

$$\mathbf{AI}\,\frac{38^\circ}{20'} = x$$

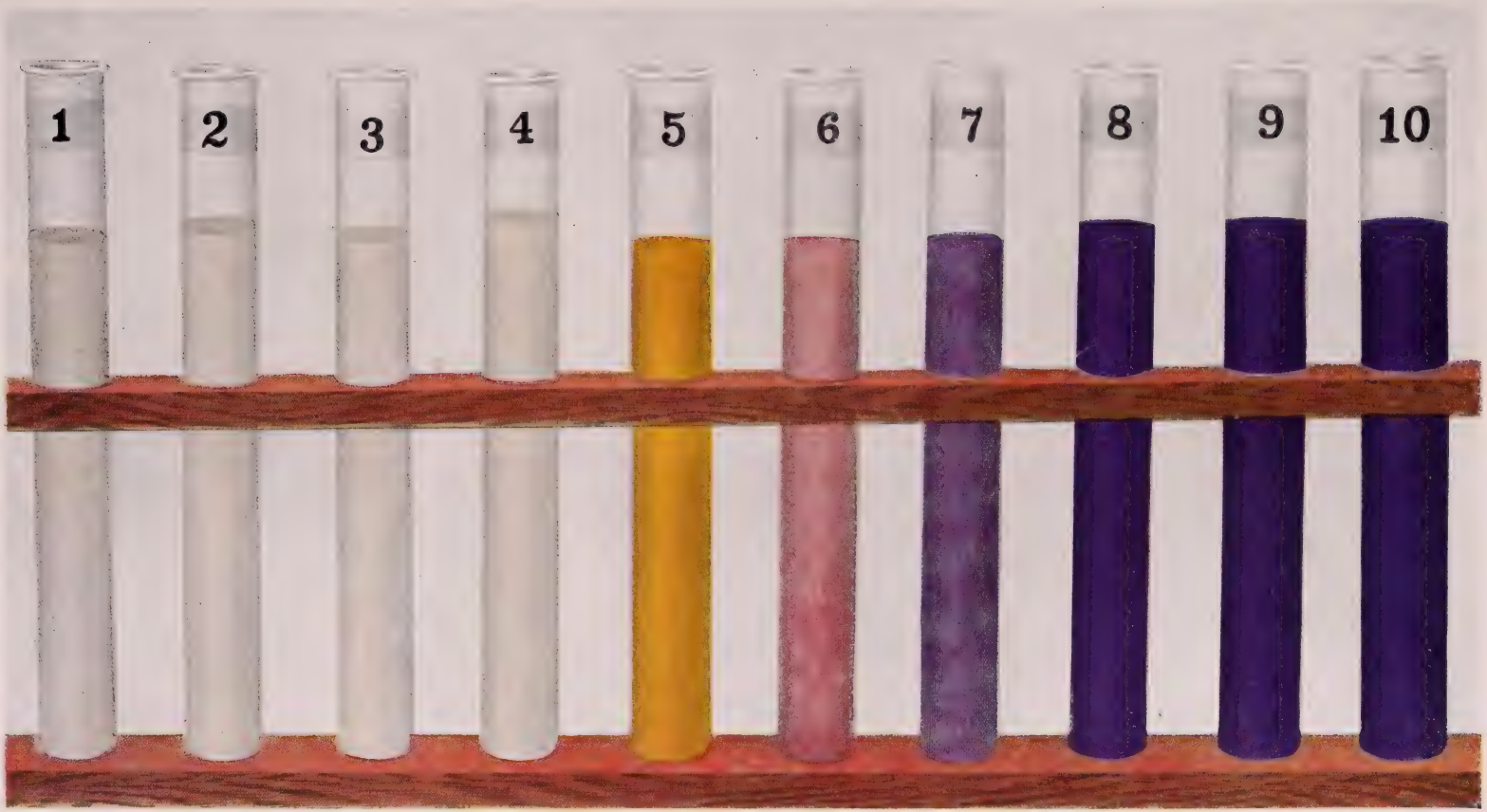
—x representing the number of cubic centimeters of a 1 per cent. starch solution reduced by 1 cc. of a definite ferment solution at 38° C. within 20 minutes.

To obtain the necessary standard solutions of saliva (ferment solutions), it is necessary to dilute the normal saliva in such a manner that any geometrically diluted portion will be n times weaker than the preceding portion. To accomplish this procedure in a most convenient manner, the method suggested by Wohlgemuth is most satisfactorily employed. It is known as the rotation method, and applied as follows: Ten perfectly clean and dry test tubes of equal length and diameter are selected, placed in a test-tube rack and marked with figures 1 to 10 in rotation with a wax pencil. Tube 1 receives 1 cc. of undiluted saliva, while each additional tube receives 1 cc. of distilled water. Tube 2 receives in addition 1 cc. of the same undiluted saliva as tube 1. With a suitable pipet of one cubic centimeter capacity, divided into tenths, this saliva mixture is drawn into

TABLE 1.

Phase I. Numbering of tubes.	Phase II. Division of distilled water.	Phase III. Dilution of saliva.	Phase IV. Absolute quantity of saliva.	Phase V. *See below.*	Phase VI. *See below.*	Phase VII. *See below.*	Phase VIII. Results.
No. 1	0 cc.	1 cc. (pure)	1 cc.				Light-yellow
" 2	1 cc.	1 cc. ($\frac{1}{2}$ dil.)	0.5 cc.				Light-yellow
" 3	1 cc.	1 cc. ($\frac{1}{4}$ dil.)	0.25 cc.	Placing of all the tubes in a water-bath of 38° C. for 20 minutes.	Removal of all the tubes, cooling by filling with cold tap-water to within an inch from neck and replacing in numerical rotation into test-tube rack.	Adding 5 drops of N/100 iodin solution to each tube, starting with tube 10.	Light-yellow
" 4	1 cc.	1 cc. ($\frac{1}{8}$ dil.)	0.125 cc.				Light-yellow
" 5	1 cc.	1 cc. ($\frac{1}{16}$ dil.)	0.062 cc.				Light-yellow
" 6	1 cc.	1 cc. ($\frac{1}{32}$ dil.)	0.031 cc.				Yellow-brown
" 7	1 cc.	1 cc. ($\frac{1}{64}$ dil.)	0.016 cc.				Bordeaux-red — (limes)
8	1 cc.	1 cc. ($\frac{1}{128}$ dil.)	0.008 cc.				Blue —
9	1 cc.	1 cc. ($\frac{1}{256}$ dil.)	0.004 cc.				Blue —
" 10*	1 cc.	1 cc. ($\frac{1}{512}$ dil.)	0.002 cc.				Blue —

* 1 cc. of contents of tube 10 being discarded as waste.


1
2
3
4
5
6
7
8
9
10

the pipet and expelled back into the test tube. This maneuver must be repeated three times to insure perfect mixing. Exactly 1 cc. of this saliva mixture of tube 2 is now transferred by means of the same pipet to tube 3. The same maneuver of mixing and transferring the diluted saliva as contained in tube 3 is repeated, and so on until finally tube 10 is reached. Again, 1 cc. of the mixed saliva of this last tube is withdrawn and discarded. Each one of the ten tubes should now contain exactly 1 cc. of fluid; the amount of saliva present in each tube differs exactly by 100 per cent. from its right or left fellow, as may be easily ascertained by reference to Table No. 1.

PREPARATION OF THE STARCH SOLUTION.

One gram of so-called soluble starch (Lintner) is carefully weighed off, transferred to a porcelain capsule or casserole, and throughly mixed with 100 cc. of cold distilled water. The mixture is then heated with constant stirring until a perfectly clear solution is obtained. After cooling, the solution, if not perfectly clear, is filtered into a graduated cylinder, and the lost portion of the water is replaced by fresh distilled water. The completed solution is transferred to a clean glass-stoppered bottle. This starch solution, if kept at a cool temperature, will remain unchanged for about a week. The addition, to aid preservation, of chloroform, toluol, etc., is not to be recommended, as there is always a liability of precipitating the starch.

PREPARATION OF DECINORMAL IODIN SOLUTION.

Decinormal iodin solution should preferably be obtained from chemical supply houses, or it may be prepared as follows: Dissolve 12.653 grams of dry iodin U.S.P. in a solution of 18 grams of potassium iodid U.S.P. in 300 cc. of distilled water. Then add enough water to make the solution measure at ordinary temperature exactly 1000 cc. Transfer the solution to an amber-colored glass-stoppered bottle and keep in a dark place. For testing the starch solution under consideration, a conveniently small quantity of the decinormal iodin solution should be diluted with nine times its volume of distilled water. This N/100 iodin solution preferably is kept in an amber-colored dropping bottle.

TECHNIQUE IN DETERMINING THE AMYLOLYTIC INDEX OF SALIVA.

Solutions required.

(1) Ferment solution.
(2) 1 per cent. soluble starch solution.
(3) Distilled water.
(4) N/100 iodin solution.

Ten test tubes are placed in a test-tube rack and numbered in rotation with a wax pencil. The first tube receives 1 cc. of the saliva to be tested; the other tubes receive 1 cc. each of distilled water. The second tube now receives in addition 1 cc. of the same saliva. In accordance with the directions given above, the saliva solution of the remaining tubes is now geometrically diluted so that each tube will contain 100 per cent. less saliva than the preceding tube.

With a suitable 5 cc. pipet, each tube will now receive 5 cc. of the 1 per cent. starch solution, starting with the tube which contains the smallest amount of saliva, namely, tube 10.

The ten tubes are at once transferred to a suitable water-bath having a constant temperature of 38° C. This water-bath consists of an ordinary enameled metal dish, about 8 in. wide and 4 in. deep, placed upon a suitable tripod. To hold the tubes in position, a wire basket such as is used in bacteriologic work is placed in the dish together with a centigrade thermometer. The dish is filled with tap-water to within an inch from the top, and the water is heated to 38° C. By lowering the flame sufficiently, the water is kept constantly at the above temperature. The test tubes must be immersed in the warm water

in such a manner that the surface of their contents will be slightly below the surface of the surrounding warm water, to insure uniform heating.

The tubes are left in the water-bath for exactly 20 minutes; they are then removed, and each one is filled at once with cold tap-water to within an inch of its rim and is placed in numerical rotation back into the test-tube rack. The cold water will interrupt the ferment action. Each tube now receives 5 drops of the N/100 iodin solution, starting with tube 10. A definite color reaction can be observed at once. The higher-numbered tubes, say 8 to 10, will usually exhibit a deep blue color, tube 7 a bluish-red and tube 6 a Bordeaux-red color, tube 5 a brownish yellow color, while tubes 4 to 1 will show a very slight yellow color. The colorimetric manifestations indicate the reaction between the iodin and the starch solution. Completely reduced starch (maltose) gives no color with iodin. This is equally true of achroö-dextrin, while erythro-dextrin produces a Bordeaux-red color. The unaffected starch shows a blue color. (See colored plate.) Occasionally it will be observed that an intermediate tube in the routine color sequence exhibits a color in which the reddish shade predominates over the blue. In such cases it is best to add one or two more drops of the iodin solution. If the resultant shade is now more blue than red, the tube is classified as containing unreduced starch, while if more reddish in character, it is classified as containing reduced starch. The tube containing the Bordeaux-red color is referred to as *limes*, that is, the border line between reduced and unreduced starch, and the next tube lower in the scale (brownish-yellow color) furnishes the basis for obtaining the amylolytic index.

TABLE 2.—AMYLOLYTIC INDEX OF SALIVA.

No. of tube.	Saliva.	H_2O.	Starch 1 per cent.	Time.	Temperature.	Iodin sol. N/100	Amylolytic index.
1	1 cc.	0 cc.	5 cc.	20′	38°	5 min.	5
2	0.5 cc.	0.5 cc.	..	..	..	..	10
3	0.25 cc.	0.75 cc.	..	..	..	..	20
4	0.125 cc.	0.875 cc.	..	..	..	..	40
5	0.062 cc.	0.938 cc.	..	..	..	..	80
6	0.031 cc.	0.969 cc.	..	..	..	..	160
7	0.016 cc.	0.984 cc.	..	..	..	..	312.5
8	0.008 cc.	0.992 cc.	..	..	..	..	625
9	0.004 cc.	0.996 cc.	..	..	..	..	1250
10	0.002 cc.	0.998 cc.	..	..	..	..	2500

ESTIMATING THE AMYLOLYTIC INDEX.

To express the amylolytic index as deducted from the results of the above tabulated experiment, it is necessary to divide the quantity (5 cc.) of the starch solution employed by the absolute quantity (0.016 cc.) of the saliva employed. The resultant quotient represents the number of cubic centimeters of a 1 per cent. starch solution which are reduced

by 1 cc. of the saliva within 20 minutes at a temperature of 38° C.:

$$0.016 \div 5 = 1 \div x$$

$$x = \frac{5 \times 1}{0.016} = 312.5$$

To eliminate loss of time in figuring the amylolytic index in each individual experiment, the accompanying ready reference table will be found serviceable. (See Table 2.) In using the table, read off the number of the tube in the test-tube rack containing the *limes* of the experiment under consideration, and select the next lower tube as the base for the mathematical equation. By referring to the first column of the table, which represents the tubes in numerical sequence, we find that the amylolytic index of each tube is represented by a definite figure in the last column.

(To be continued.)

40TH AND SPRUCE STS.

Possible Relationship of Oral Focus to Chronic Osteomyelitis.

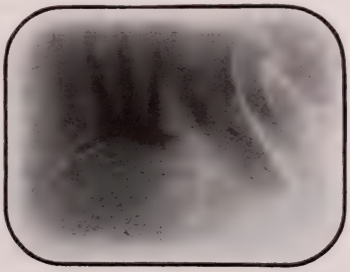
(A Case Report.)

By M. HILLEL FELDMAN, D.D.S., New York, N. Y.,
DENTAL SPECIALIST, LINCOLN HOSPITAL, NEW YORK CITY.

SCIENTIFIC investigations to determine the exact relationship existing between systemic disorders and oral foci seem to be resulting in the collation of no small amount of evidence which tends to lay responsibility for many ills at the door of the oral cavity. The case which the writer reports here is very interesting in this connection.

Some six weeks ago, at present writing, the patient, male, thirty-six years of age, presented at the dental operating room of Lincoln Hospital with the following history:

About twenty-one years ago the patient suddenly experienced a series of stub-



born pains in his right leg. The surgeons at Mt. Sinai Hospital diagnosed his case as osteomyelitis, and when minor treatment availed nothing the leg was amputated at the hip joint. During the succeeding years the patient has been

operated upon some thirty-odd times in various parts of the body—the left leg, both elbows, both arms, shoulders, left side of the stomach, and on the left side of the face at the lower border of the mandible for osteomyelitis of the jaw.

For a number of years the patient has had pains in the left cheek-bone and left great toe. The latter pain he has had incessantly, dull and persistent, for over twelve years.

The mouth of the patient was radiographed and it was found that considerable rarefaction was present about the lower incisors. The accompanying radiograph illustrates the condition of the tissues surrounding the teeth. There was no indication in the regular examination of the patient's mouth to cause suspicion to rest upon these incisors. Our findings only emphasize the absolute necessity of roentgenographic determinations to supplement our clinical findings.

Extraction of the six lower incisors, followed by removal of the necrotic alveolar and bony tissue and polypi resulted in what I consider to be a remarkable recovery. The pains about the cheek-bone and great toe have disappeared completely.

When we take into consideration the fact that no attempt had been made to relieve the patient by means of autogenous vaccines, we cannot but come to the conclusion that we have found the focus of infection which was draining its toxins into the blood stream these many years.

1339 Prospect ave.

Correspondence

Dental Service in France.

To the Editor of the Dental Cosmos:

Sir,—After wishing for many months to be able to go to France for service in the Dental Corps, and trying in many ways to secure an opportunity, finally the chance came, and almost before I realized it I had landed at Bordeaux and was on my way north to Paris. It was bitter cold, everywhere there was a shortage of coal, and I was very thankful when the hospital was reached.

Our hospital lies in a beautiful, peaceful valley. One can hardly realize that within a little over a hundred miles away the greatest war in the world's history is going on. Quite frequently we hear the heavy guns booming out their messages of death and destruction.

But my thought is to give you an idea of the French soldiers' mental attitude toward dental work and the prophylaxis and conservation of their teeth. In a way they are just like children; they are sufficiently bright, but they have never been taught that it is for their own personal good to care for their teeth.

I recall one instance where a man was badly wounded in the thigh; the wound failed to heal, and finally the surgeon in charge asked me to look at the man's mouth. There I found eight or ten badly broken-down and decayed roots, and of course an abscess on the end of each root. The roots were extracted, and in a week's time the wound in the thigh had healed. The soldier thought it a miracle, but it was only relieving the blood of organisms that it could not handle. That man's attitude toward dentistry changed at once. He had be-

fore had the idea that dentistry always meant pain, and had laughed when told that his mouth must first be put in a cleanly condition before his wound would heal; but when he saw the results on his own body his astonishment and gratitude were unbounded. Not only did he report to me every week and show me how he was caring for his remaining teeth, but he passed the word along to others, and he was never happier than when he could bring a new patient to me.

In the case of new patients, if there is extensive extracting to be done, they must be told that plates will be given them after their mouths have healed. This they never seem to realize, and almost always ask what they will eat with, if their teeth—or rather the remains of their teeth—are extracted. Some of the men absolutely refuse to go to the dentist.

There was one case in which a man was badly in need of dental attention, but refused to go to the dentist. His mouth had been examined in the ward and he had been told to report in the dental operating room. One night about ten days later he caught cold; an upper cuspid failed to drain, as it had been doing, into his mouth, and the upper right side of his face became swollen, almost closing his right eye. He was frightened, and the next morning reported to me bright and early. The troublesome root was extracted without delay and in twenty-four hours he was happy again. Two days later, when his dressing was being removed, he asked to have all the decayed roots extracted.

Many of the men have splendid teeth, especially those whose homes have been in the country, but owing to their lack of knowledge of cleaning and caring for them they have become heavily incrusted with tartar, this accumulation of filth pressing and irritating the gingival margins in a shocking manner. After receiving a thorough prophylactic treatment and a talk on how and why they should keep their teeth clean, it is surprising and gratifying to watch the way in which they do what is taught them. In many cases where it has been possible to save the tooth, a root amputation has been performed. This the *blessés* liken to the removal of an *éclat,* or piece of shell.

In the beginning of the war many French dentists were mobilized and sent to fight; undoubtedly this was a mistake, although at the time every man available was needed, and the future for the moment was put aside. At the present time, however, they are being gradually brought back and are now doing splendid and necessary work in the many different hospitals.

F. Correll Bartleman, D.D.S.

France, September 10, 1917.

PROCEEDINGS OF SOCIETIES

Northeastern Dental Association.

Twenty-third Annual Convention, at Worcester, Mass., September 26, 27, and 28, 1917.

WEDNESDAY—*Morning Session.*

THE twenty-third annual meeting of the Northeastern Dental Association was called to order by the president, Dr. David Manson of Burlington, Vt., Wednesday morning, September 26, 1917, at 12 o'clock, in the Bancroft Hotel.

The reading of the minutes of the previous meeting was dispensed with, as they had been printed and copies mailed to the members.

The report of the Board of Censors was read by the secretary, Dr. ALVIN A. HUNT of Hartford, Conn.

The report was on motion accepted.

The Secretary read letters of resignation from Drs. James E. Heap of Providence, R. I., William O. Beecher of Waterbury, Conn., William B. Rogers of Providence, R. I., William N. Butler of Hartford, Conn., and Levi C. Taylor of Hartford, Conn.

On motion of Dr. THOMAS J. BARRETT of Worcester, Mass., the resignations of these gentlemen were accepted.

Dr. BARRETT then made a motion that Dr. Levi C. Taylor of Hartford, and Dr. William O. Beecher of Waterbury, be elected to honorary membership. (Motion carried.)

Dr. HUNT read communications from Mrs. E. I. Bazin, the widow of Dr. Bazin, who died in 1915, Dr. Herbert L. Wheeler of New York, and Dr. Frederick T. Murlless, Jr., of Hartford.

The report of the Secretary was the next business on the program.

Dr. HUNT. I have no regular report to make, except the communications I have read. I am sorry that we were delayed in getting out the program this year—through no fault of mine. We have had to make some changes in it since it was published. Lieutenant Wheeler's paper will be read on Friday morning, instead of on Thursday evening. On Thursday afternoon, Dr. Tracy, and probably Dr. Asch, will be here to talk on Preparedness. Dr. D. B. Parker of Brooklyn, who was on the program for a paper, will be unable to attend the meeting, having been sent to France. We succeeded in getting Dr. K. H. Thoma of Boston to give us a paper in place of Dr. Parker. Dr. Thoma's paper will be something on the use of anesthesia in oral surgery. Dr. N. B. Nesbett of Boston, who is on the program for Friday morning, will change places with Dr. Wheeler. Some further rearrangement will probably be called for so far as discussions are concerned.

I should like to emphasize the fact that when members change their addresses, it is desirable that they notify the secretary, because several complaints were made about members not getting

the program, and several programs were returned on account of wrong addresses.

The report of the Treasurer was presented by Dr. LESLIE A. SPELMAN of Hartford, Conn., who had been appointed to fill the unexpired term of Dr. Frederick H. Saunders of Westfield, Mass., Dr. Saunders having been called to service in the U. S. army.

On motion, the report was received and referred to the Executive Committee, acting as the Auditing Committee, to report on it later.

The report of the Editor, Dr. Irving E. Pendleton of Lewiston, Me., being next in order, the President explained that the Proceedings of the association as printed and distributed to the members are usually considered to be the report of the Editor.

Under reports of special committees, the Secretary stated that there was no report from the Committee on Scholarship, Dr. Murlless, chairman, except one of progress. For several reasons the matter had been held up.

The President explained that the matter of carrying out Dr. Cary's suggestion while president in 1916, that provision be made for a sinking or permanent fund for the establishment of a scholarship had been referred to the Board of Censors, but that there was no report to make in regard to it except one of progress.

Dr. HUNT stated that Dr. Saunders had purchased a Liberty bond as a nucleus for this fund. He had asked to have the matter deferred until the last meeting of the Board of Censors, but, in his absence, no report except one of progress could be made until the matter could be worked out by the new treasurer.

Under miscellaneous business Dr. BARRETT made a motion that the secretary send a telegraphic message to Dr. Blake A. Sears of Hartford expressing to him in fullest measure the deep sympathy felt by the members of the society in his grief over the sudden death of his wife. (Motion carried.)

Dr. BARRETT made a motion that the chair appoint a committee of five to bring in a list of nominations of officers for the coming year. (Motion carried.)

The meeting adjourned until the afternoon session.

WEDNESDAY—*Afternoon Session.*

The meeting was called to order by the president, Dr. Manson, at 2.45 P.M.

The President appointed the following as members of the Committee on Nominations: Drs. Thomas J. Barrett, Worcester; W. R. Pond, Rutland; Albert E. Cary, Hartford; Joseph E. Farnum, Providence, and C. Frank Bliven, Worcester.

Dr. MANSON then resigned the chair to the first vice-president, Dr. Ira B. Stilson of Providence, and read the President's Address, as follows:

President's Address.

By Dr. DAVID MANSON, Burlington, Vt.

I esteem it a privilege and a high honor to have been chosen to preside over the deliberations of this meeting of the Northeastern Dental Association, and it is with much satisfaction that I welcome you as members of this great organization of New England dentists.

I also extend a most cordial greeting to all ethical members of the profession, with the hope that our deliberations, essays, and clinics may prove of such interest and profit to them that we may later greet them as members.

It was in this City of Worcester, on October 24, 1895, that the Northeastern Dental Association was formed by the union of the Connecticut Valley Dental Society and the New England Dental Society; and since the Connecticut Valley Society was formed in 1863, and the New England, through the Merrimac Valley, had a like record, we may properly claim that the history of the Northeastern dates from that time. The newly formed Northeastern Association chose as its first president Dr. James McManus of Hartford, who was in 1869,

forty-eight years ago, president of the Connecticut Valley Society, and I doubt if we have today a single member who has an equal record of attendance at our meetings—certainly not one who since the organization was formed has been more keenly interested in all that pertains to the advancement of the association and our profession. The high esteem in which Dr. McManus is held by the members is a deserved tribute to one who has always stood for the highest ideals in private and professional life.

As stated in our constitution—"The objects of this association are to unite in one society the dentists of New England . . . . who are members of their respective state societies," etc. In other words, to unite the members of the different state societies in one great New England Association.

In the formation of a new organization one of the most important things is the selection of a suitable name, a name that will be at once suggestive and comprehensive, and expressive of the work that the organization proposes to accomplish. I would not question the wisdom of those who selected the name for this society, but it would seem that the name Northeastern is not at all suggestive for an organization that has for its field of activity a definite geographical section of the country. Northeastern might mean Northeastern Maine or Northeastern Massachusetts; certainly it does not definitely suggest New England. If it were called as it would seem that it should be, the New England Dental Association, I believe that its work would be better understood by many dentists who are not now familiar with it, and would result in an increased membership; and I cannot but believe that in holding to a name that is not at all suggestive of the particular field of our endeavors or expressive of the work of our organization, we are working under a continual handicap in seeking to make it, as it should be, the great dental association of New England. I believe it would be to the advantage of this organization to be known as the New England Dental Association.

DOMINANT FORCES IN THE DEVELOPMENT OF DENTISTRY.

With the birth of dentistry there came into existence the dental college, the dental journal, the dental society, and the dental examining board, and these together may be termed the progressive forces of our profession.

Each of these forces has its own particular sphere of work and usefulness, and it is the intermingling of these influences that has made possible the wonderful progress in dentistry. It would perhaps be difficult to say which of these forces has had the most important part in the advancement of our profession, yet we may safely say that the dental society has had as great a part as any.

The dental college is the principal force in the early or formative period of the dentist's professional life, and dental education has continually advanced by reason of increased requirements for admission, and by lengthened and more systematic courses of instruction. The dental journal is a continual educational force in that it brings to the profession the best scientific teaching and methods of practice. The dental examining board is a constant and compelling factor in that it passes on the knowledge and ability of those who would enter into professional practice, and compels the colleges to properly fit their students before graduating them if they are to successfully pass these boards; yet back of all these forces is the great body of organized dentists as represented in the many state societies, with perhaps its highest expression in the National Dental Association.

It is these organized bodies of dentists who have brought into effect the laws regulating the practice of dentistry in the different states and creating the examining boards, who demand of the colleges that students be given the most advanced instruction in theory and practice, and be properly fitted for active professional life, who demand of the journals that the profession be kept informed as to the most advanced scien-

tific knowledge and methods of procedure. It is the duty of the dental society that it bring before its members the best scientific teaching and the best methods of practice and procedure, and to make its meetings so attractive and instructive as to command an attendance in keeping with the field it covers.

In this respect this organization of New England dentists has a special opportunity and a special duty, namely, to seek to bring the practice of dentistry in New England up to the highest possible standard by conducting each year a meeting along the most progressive lines, and of as high educational advantage and opportunity as it is possible for any other section of the country to hold, and such as it would not be possible for any single New England state to conduct.

If we are to justify our existence as the great dental association of New England we must have something to offer that the state society does not provide.

POSTGRADUATE MEETINGS.

The form of dental meeting is changing somewhat, and in some sections of the country they are holding with much success the so-called postgraduate meetings, where instead of having many essayists to present the different subjects in a limited time, a few paid lecturers are secured, and the subjects considered are presented in a series of lectures covering the entire field, and the clinics are conducted by dividing the convention into as many groups of observers as there are clinicians, each group visiting the different clinics at stated intervals. Where such meetings have been held they have had enthusiastic support, and have resulted in increased attendance and membership.

We want in this New England Association the very best dental meeting that it is possible to have, and we want an attendance and membership such as our territory warrants. If the postgraduate meeting will give us this, it is worthy of our consideration and adoption.

THE DENTAL PROFESSION AND THE ARMY.

The dental profession has responded in a splendid and patriotic spirit to our country's need in the present world war. Throughout the country dentists have given generously of their time and ability to properly fit the mouths of men for service in the army and navy.

Because of this work, rendered wholly from a sense of patriotic duty, many men have been enlisted in the army and navy who would otherwise have been rejected because of poor teeth and unhealthy mouths, and the mouths of large numbers have been put in the best possible condition to properly fit the men for prolonged service at the front. This service has been rendered not in response to any request on the part of the government or of the public, but rather because the profession as a whole, realizing the vital importance to the enlisted men of sound teeth and clean healthy mouths and their bearing upon the general health, and knowing that the government has failed to provide adequate dental service for the army and navy, have volunteered to render to the country and the flag a service that they are particularly fitted to give.

Many members of our profession have enlisted and are enlisting in the dental reserve corps of the army, ready to do their bit and to give up an established practice that they may serve their country and those who are to serve their country.

With the sacrifice that they are making in response to our country's need it would seem proper that those of us who are to remain at home owe it to these men to do everything reasonable in our power to protect their practices during their absence, to care for their patients, and when they return to again take up their private practice we should see to it that in every case their patients are returned to them. I would recommend that this association and every dental society in New England that has not already done so, place itself on record to that effect.

In making a suggestion that affects the different state societies it is not with the thought that this association should in any way seek to dictate the policy of the different state societies, yet we may properly consider it within the province of this association to endeavor to bring about in New England uniform action in all matters that pertain to the well-being and advancement of our profession, and to endeavor to have New England stand as a unit in such matters.

DESIRABILITY OF UNIFORM LAWS REGULATING THE PRACTICE OF DENTISTRY.

With this aim in view we should seek to maintain uniform laws regulating the practice of dentistry. Such laws should be governed by the standards of dental education, and should require of those who would enter practice that they have such professional education as is provided by our recognized dental colleges. When such a condition does exist, there would seem to be no good reason why reciprocity should not be established, in New England at least. There can of course be no reciprocity except between such states as have laws of the same standard, and that standard should be based on educational requirements. If in New England we can bring about an interchange of licenses based upon uniform educational requirements, the influence of such action should do much to establish reciprocity throughout the country.

I trust that this meeting may prove of such interest and profit to every member as to repay him for being present. The fact that our country is at war has made it difficult to prepare a satisfactory program, but we feel that we present a program that should command your approval—one of exceptional interest and educational value, the essayists and clinicians being men of the highest professional attainment and particularly qualified to present the different subjects.

DISCUSSION.

Dr. W. R. Pond, Rutland, Vt. *Mr. Chairman, and fellow members of the Northeastern Dental Association,*—I can think of only one reason why I was chosen to open the discussion on the President's Address, and that is that I am from the same state as Dr. Manson. However, I very much appreciate the honor, and wish to congratulate him on his most excellent address. I thoroughly agree with him in regard to the desirability of a change of name for this society. Of course its members all know what the Northeastern is, but in other parts of the country, if you mention its name, it does not mean anything particularly. I think that the "New England Dental Society," as Dr. Manson has suggested, would therefore be a much better title.

Now as to the field of this society. As Dr. Manson says, unless it can produce something that is better than the state societies produce, this society has but little excuse for existence. It should have a very large membership. Judging from the treasurer's report, we have now considerable money, and I do not see why we cannot have meetings that will be attractive enough to make everyone feel that he cannot afford to miss them. I believe that the postgraduate system of meetings would appeal to our members as something different from the state meetings.

Dr. Manson speaks about the dental colleges, the dental journals, the dental societies, and dental examining boards associated with the birth of dentistry. It seems to me that the birth of almost all of these things mentioned was the result of a spirit of commercialism, which I am glad to say we are getting away from. I can remember when the dental colleges, for instance, were run quite as money-making schemes. Those who ran them got the residue after all the expenses were paid, and I know of one man who is reputed to have made half a million or so out of dental education. It is fine that we are getting away from that, but we have many things yet to improve with regard to dental education. I believe that as dentistry is a specialty of medicine, the ultimate result will be that the dentist will have to have an M.D. degree or at least that his preliminary educa-

tion will be the equivalent of a medical course, and he will then specialize in dentistry.

The journals have been in somewhat the same condition. Our trade journals have served a very valuable purpose, but it is gratifying to know that we now have independent magazines, like our *National Journal* and the *Journal of the Allied Dental Societies.*

The dental societies have been a great educational factor. After all, in the words of the prize ring, the college course is only a preliminary bout. It must be along the right lines. We must have the proper foundation, but it is what we do afterward, in following up our studies, that counts in the long run. I know of men who never saw the inside of a dental school who have worked hard and improved themselves, and are much more competent and better educated men than those who have gotten a dental degree in a few months, and who think that it is sufficient to last the rest of their lives. It is better to build a house on a good foundation, but you can jack the house up and put a good foundation under it afterward, and make a respectable dwelling of it. I think that applies to dental education as well.

The dental examining boards probably have done a great deal. They are doubtless what we might call a necessary evil; I happen to be on one of them, and so I can say this without criticism. It seems as if the colleges should fit men to practice their profession without their graduates having to go before an examining board. Such is not the case, however. I often wonder how in Heaven's name some of these men slip by the colleges, when I see the way they appear before the examining board. At the present time, we do seem to need to examine these men, to keep them up to the necessary standard and to try to raise the standard for the colleges.

The matter of reciprocity between states would be quite ideal. In Vermont, we have reciprocal relations with about eight states, so far as I remember now. There are some conditions, however, that might be improved. For instance, we cannot reciprocate with New Hampshire, because they allow men to take the examination without a dental degree, and Vermont requires them to be graduates in dentistry before taking the examination. I hope that this will soon be remedied, so that the requirements may be uniform throughout New England, at least. I remember receiving a long letter from a dentist in the northern part of our state, complaining that some men came in there by virtue of reciprocity and practiced in the summer. I did not pay much attention to this, but a year later, I had another letter from the same man, saying that his health was not very good and that he would like to go to California to practice, and stating that he would like to have the advantage of reciprocity. He had a young man with him from West Virginia who was desirous of taking his practice. Although this man had objected to others coming to Vermont in the summer and taking his patients, he was glad to take advantage of reciprocity when it suited his own interests to do so. That is just one phase of the subject.

It is a good thing to take an account of stock, so to speak, to find out our weaknesses, and to think over what dentistry has accomplished. We are told, at the present time, that dentists have done wonderful things in the war, and have received well-earned recognition. Well, some of them have, but are the rest of us prepared to do the same remarkable work in oral surgery, plastic surgery, restoration, etc.? We are not. I say this emphatically. We must all increase our knowledge; we are expected to do great things. It has been said that the next great step in preventive medicine must come from the dental profession. We must do more hard work before we are ready to be absorbed by the medical profession, which is waiting patiently to take us in, when we are fitted. We are doing great things in the army, and I trust that we shall get recognition for it and an increase in rank, so that some of the older men can go into the army and do good work. Just now it is the younger men who have enlisted.

I think, as Dr. Manson says, those who go in should get all the protection that we can give them. We should not stay home to make the most that we can out of our opportunities to get our brother's practice.

Dr. Manson speaks about promptness in attendance at the meetings. That is very important. In our State Society meeting we always have the same trouble in getting the men there on time. Common courtesy dictates that we should be here promptly, and I hope that we shall have a larger attendance later in the afternoon, to hear Dr. Miner's paper. I have heard one on the same lines from him, and it was well worth hearing. We should follow up his subject, and have a comprehensive knowledge of oral conditions as influenced by the general health.

Dr. Clinton W. Strang, Bridgeport, Conn. I think the paper has touched upon points that we may well heed, and not only heed, but act upon. Times have changed wonderfully, and unless we conform ourselves to them and plan to meet conditions, we shall be on the down grade. The dental profession has made marvelous advances in every department. When we consider the conditions that existed years ago, when the speaker began to practice, we can hardly fail to wonder how we got along as well as we did.

While I am on my feet, perhaps it might be interesting to you if I entered a little bit into history. Fifty years ago next month I became a member of the Connecticut State Dental Association, and as a member of that association, became acquainted somewhat with the guiding minds of the dental profession in other parts of the country—Atkinson, Varney, and our dear old hero of prophylaxis, Riggs. Most of the older members of the profession have passed on. There are but few that I can think of at the present time who have not laid down their dental instruments. Dr. Gaylord of New Haven is still quite active at the present time, I believe, but I do not know of any other dental practitioner in New England who has devoted fifty years to the practice of his profession and is still in active practice. I have much to be thankful for, but a great deal that has come to me has been through the generosity of other men better known in the profession than myself, and my commission at this time is to pay a tribute to a man who for fifty years has been a brother, if not in the flesh, yet in sympathy and in a disposition to assist all with whom he became acquainted. I refer to Dr. James McManus of Hartford. (Applause.)

Many there are who have won the admiration of men, who by deed or quality have won the confidence of their fellows, but men regard Dr. James McManus as a brother. There is about him a genuineness that has won men and held them. He is, in every thought and feeling, a man, and yet you will agree with me that he has a heart as tender as that of a woman, and as guileless as that of a child.

In early manhood Dr. McManus made his impress on all about him. He learned the lesson of combining fervor, zeal, and enthusiasm with broad charity and sanity. The only life worth living is the life of the man who works, the man who strives, the man who does, the man who can say, "I know I have faltered; I know I have stumbled; I have left undone things that should have been done, and much that I have done had better been left undone; but, as strength was given me, I have striven to use it; I have striven to make the world better because I have lived in it."

And now I would suggest that a telegram of greeting and good-will be sent to Dr. James McManus of Hartford. (Applause.)

Dr. Stilson. I am not sure that just at this moment the motion will be in order. Discussion of the President's Address is before us now. This motion can be acted on later.

Dr. Thomas J. Barrett, Worcester, Mass. I had no intention of discussing the President's address, but it is such an excellent one, exhibiting so much thought and covering such a variety of subjects, that it is not fair to pass it without comment.

The first thought in the address that

impressed me was the matter of a change of name for this society. The president has certainly presented a good argument for an alteration, and has caused thought to be given as to the wisdom of adopting a new name. Many times since the convention was advertised to be held in Worcester, I have been asked what the association was, and what territory it covered. As the president has said, it is an association of dentists of the states of New England. That being true, it would seem that we could find a name better suited than the Northeastern, as that is very indefinite as to meaning. I think it a matter that could well be taken up and considered by a committee, with the request to report later.

Another matter that I might say a word on is the question of reciprocity so earnestly referred to by our president. It is a subject that has been discussed for years, and treated from various viewpoints by various men. No one can so well understand the safeguards that are necessary before new laws are adopted and old ones changed as those who serve on state boards, and meet the candidates and know something of their history, their character as practitioners, and their ability as professional men. Most of you know the law only as practitioners. We who occupy official positions, who meet and have to deal with the men who are desirous of coming into the state through reciprocity, are better informed as to the safeguards with which we should surround the people than are you. No well-qualified practitioner of dentistry should have any trouble in transferring his labors from one state to another. Dental laws are not intended to prevent or hamper the worthy and capable man, and rarely ever do so. They are, in fact, police regulations of dentistry enacted solely to protect the public from incompetence and ignorance. There are no two states in the Union that have exactly the same laws or require the same tests in examination. There are many that are quite similar, but no two boards exact from the individual candidate the same tests. If a man is engaged in the practice of dentistry as his life's occupation and means of livelihood, it does not seem to me to be any hardship for that individual to be asked to demonstrate by some fair test, such as a filling operation, his ability to do that work. He is requesting the privilege of going into the state to do that work, and wants a license to do it, a permit to do it among all the people. Now, then, to demonstrate before a fair board his ability to do that is not a hardship; on the other hand, it is a fair provision of protection for the people. It is no hardship for any tradesman or for any specialist in any line of endeavor to be asked to demonstrate his fitness and his ability in his particular line. The Massachusetts Board has for years required that of every practitioner who desired to come into the state. There never has been a case—I say *never,* and I will not qualify it at all—of a deserving practitioner of standing in the community from which he came, who brought credentials as to his ethical practice and honesty of purpose, who experienced any difficulty in meeting the requirements of the Massachusetts Board; the incompetent and the charlatan have.

The board never submits a practitioner of years to the same test as the recent graduate, fresh from his studies, but it does exact and expect from the dentist who has been in practice for five years or longer that he demonstrate by a filling operation his ability to do dental work as a man should after having spent that length of time in practice. From a single operation the members of the board have been able to decide as to his fitness, the balance being always in his favor, I might say. The character of his work might not measure up to what we expected, but if it is done with care and shows a degree of skill, if it shows that he has practiced, and that he may be regarded as a safe man, we license him. We never subject him to a hard or unusual test. I think before the profession goes on record as saying that we should have national reciprocity by law and waive all tests, they should understand what the state boards are trying to do for them as well as for

the public. To let down all barriers and restrictions and waive all examinations would be a grievous mistake, and would open wide the door for the itinerant and unworthy instead of helping the deserving. This is a subject that has been before the National Board of Dental Examiners for fifteen years and longer, and no acceptable solution has yet been found. We must have a nearer approach to a uniform test and a uniform examination, and not have such a wide variance throughout the land, before we can hope for national or even New England reciprocity.

Dr. George A. Maxfield, Holyoke, Mass. With regard to changing the name of the association, I think most of you do not know why we adopted this name when we organized the society. As I was the one who made the proposition to the Connecticut Valley Dental Society and the New England Dental Society to unite and become one society, and wrote the constitution and by-laws, and also proposed this name for the new society, you may be interested to hear the reasons for this movement and why we adopted this name. At the annual meeting of the Connecticut Valley Dental Society in 1892 Dr. L. D. Shepard of Boston read a paper advocating the dissolution of all dental societies aside from the different state dental societies, and uniting all our efforts to strengthen the different state societies. This raised quite a feeling among the members of the Connecticut Valley Society, for at that time the Connecticut Valley Society was the strongest dental society in New England, and the members were very reluctant to consider any such move to break up their society. I agreed with Dr. Shepard that our state dental societies needed all the help they could get, and being a member of the Connecticut Valley, New England, and Massachusetts Dental Societies I made the proposition in 1893 to the Connecticut Valley Society and the New England Society that we consolidate into one. This proposition was agreeably received, and a committee was appointed by each society to arrange the details and present their plan at a union meeting to be held here in Worcester in 1894. The committees appointed me to write a constitution and by-laws to present to the new society as soon as union was effected. At that time there was much talk of enlarging the National Dental Association, dividing the country into districts, and having a branch society in each district, and on account of this plan I proposed the name of the Northeastern Dental Association, thinking that when the reorganization was completed we could go in as a body, and be the representatives of that association in this section of the country. We met here in Worcester, a joint meeting of the two bodies, and after hearing the report of the committees both societies voted to unite. The new constitution and by-laws were adopted as well as the new name, and officers were elected, and that was the beginning of this association. Since then a different plan was adopted by the National Dental Association, it having taken in all the different state societies as component parts, which leaves us out in the cold. Individually it does not make any difference to me what name we go under. We have done pretty well for the past twenty-three years under our present name, but whatever changes are made I hope this association will always keep up its organization.

Dr. Maxfield then made a motion that a committee of three be appointed to consider the recommendations of the President in his address, and report at a later meeting of the society. (Motion carried.)

Dr. Stilson appointed, as the members of this committee, Drs. C. W. Strang, A. E. Cary, and W. R. Pond.

Dr. Manson then resumed the chair, and called for a consideration of the motion of Dr. Strang in regard to sending a message of greeting to Dr. McManus. (Motion carried.)

(To be continued.)

Eastern Association of Graduates of the Angle School of Orthodontia.

Eighth Annual Meeting, held in New York City, May 7 and 8, 1917.

(Continued from page 73.)

MONDAY—*Evening Session.*

The evening of Monday, May 7th, was devoted to a banquet to the members and guests of the society.

Following the banquet, Dr. N. W. JANNEY, New York City, gave a lecture entitled "An Experimental and Clinical Study of the Isolated Thyroid Hormone."

[This paper is printed in full at page 133 of the present issue of the DENTAL COSMOS.]

DISCUSSION.

Dr. Milo Hellman, New York. I enjoyed the talk immensely, but I was rather expectant of hearing some other phases in conjunction with this work. Being somewhat acquainted with the literature on this subject, I know there are a number of experimenters who have done some work along the line of the calcium metabolism in conjunction with the secretion of these glands. Fleischmann, who has experimented on the effect of the thyroid gland on the teeth, has brought to light the fact that, in rodent animals, if the parathyroids be removed, certain defects will appear on the rodent teeth; and when thyroid extract was administered, the normal form of the tooth would be restored.

Kranz of Germany has observed that certain vertical or horizontal ridges are found on the teeth of cretins, and by removing the thyroid gland in pigs he reproduced experimentally those marks on the teeth.

I should like to ask Dr. Janney whether he has made any observations on the effects of thyroid deficiency on the skeletal structures or other parts that depend mainly on calcium metabolism.

Dr. Janney. In a talk of this kind it is practically impossible even to touch on the various chapters of this enormous book—this great tome of Endocrinology. One of the most fascinating chapters Dr. Hellman has mentioned in his question, the relation of the mineral metabolism to the ductless glands. Studies similar to those we have made on the carbohydrate metabolism could be made on the calcium metabolism. In our work we have not attempted to make any inroads in this field for lack of time. It has taken years of labor to work out these few principles which it takes but a short time to discuss.

I would be delighted to get some information from your experience along this line. Undoubtedly the thyroid, as well as the parathyroids, exert a profound influence on calcium metabolism. I am inclined to think that other ductless glands also exert a similar influence. I have noticed that the teeth in almost every case of thyroid disease have a softened appearance—I cannot explain it in your vocabulary—but the teeth appear badly worn, and show a lack of proper calcification. This fact is very well known to you, I have no doubt. I have observed the same condition in hypopituitarism. Perhaps you can give me further information on this point. It has suggested itself to me that this may be another example of the synergistic

action of the endocrine glands, or rather its failure.

It is too bad that so little good work has been done on the calcium metabolism and its control by the ductless glands. It is a phase which will probably be worked out in the near future. It needs only the workers to do it. It is a practical subject, as calcium analyses are among the most accurate methods at our command in metabolic work.

Prof. W. K. Gregory, New York. I come into this field from such an entirely different quarter that I cannot make any comment worth while. I might compliment Dr. Janney upon the fact that although I am absolutely innocent of any knowledge of physiological chemistry, I have been able to follow his thought from the beginning to the end to my own satisfaction. It is certainly a difficult matter to make clear to a layman, as I am in reference to this matter, and it has been very helpful to me in this way: As a paleontologist and comparative anatomist, thinking and dealing with evolution in a large museum—the American Museum of Natural History—I have continually brought to my attention the regulation of growth; that is, the fact that there is a certain predetermination, as it were, in the organism which causes things to stop at a certain point. Our middle finger, for example, is generally the longest, and our thumb the shortest. There are these determinations of growth throughout the organism, and as we follow any race of animals through the geological record—we can follow them through the strata for many thousands of years—we find that this regulation of certain fixed ratios of one part to another changes. That is all that evolution is—a change in the relation of one part to another. I think the same thing has been made clear to many people, that this work on the ductless glands will eventually help us to understand the phenomenon of the regulation of growth, and the secular changes of what are individually fixed relations—that it is all controlled by the ductless glands.

I am sorry that this is such a vague idea, but it is the only idea from my work that has any bearing on this very interesting paper.

The President. I would like to ask Dr. Janney if the salivary secretion has been taken into consideration in its enzymic action in relation to pancreatic digestion of carbohydrates. I find by closely tabulating the enzymic action of the salivary gland in our work in orthodontia, that as the functional exercise of the organ is increased through our procedure, the stimulation resulting from contact of the teeth and an improved general tone of the body results in an increased quantity of ptyalin, quantitatively analyzed, which has a decided effect on the ferments in feces analysis.

I would like to know if the salivary secretion has been studied at all. We find that in general medicine salivary secretion has held a very small place in the minds of experimenters.

Dr. Janney. There has been practically no work done as yet on the subject Dr. Ferris mentions.

Professor Gregory. May I ask the essayist if his idea is that not one but all these glands control the growth of different parts of the organism. For instance, the size of the jaws, or any other bony element, would any one of these glands have a predetermining influence? According to your polygon, they all seem to have some part.

Dr. Janney. I am glad Professor Gregory spoke of that point, because it has called my attention to a lack of development of that hypothesis of which I have been guilty. I have endeavored by the diagram to express crudely the action of the glands as synergists, that is, the action which, as I have stated, must be ascribed to more than one gland.

Take, for example, the control of the fat metabolism. Persons and animals that have a disturbance in pancreatic action tend to obesity. Evidently the pancreas has something to do with this, and a disturbance of the internal secretion of the pancreas causes it, whether directly or indirectly. But the same holds true in the case of the thyroid;

cretins and young dogs with the thyroid removed grow fat and sluggish. The thymus also exerts a control over the fat metabolism; a hypopituitary patient tends to obesity and mental torpor. This, then, is an action which belongs not to one but to several of the ductless glands. I have used this example to illustrate the synergistic action of these organs.

Aside from this general effect, the endocrine organs have a more definite, localized, or specialized action, which I failed to bring to your attention. For instance, the interstitial tissue has a special control over the secondary sexual characteristics. We have, then, special parts of the body which represent special spheres of control of special endocrine organs. In controlling these local areas, general metabolic processes also play a part. It seems as if one gland might exert the controlling influence, although the others still exercised an effect on the general metabolic processes. Never will these difficult questions be elucidated until we have isolated and properly understand the chemical nature of the various hormones, which is a task of enormous difficulty.

The President. Has Dr. Janney noticed in acromegaly the fact that the inferior maxilla has greatly increased? In two cases of that kind at the Manhattan Hospital, which I have radiographed, the pituitary body was found greatly increased in size. Before our society in Boston we had the opportunity of seeing a skull where the enormous mandible was large enough to envelop the superior maxilla. The case was operated upon, but the patient succumbed under the operation.

Dr. Janney. Of course it is well known clinically that in acromegaly one very definite sign is an increase in size of the mandible. The hands and feet and face are also affected. How to fit that into our theory is very difficult. Have we here a hyper-function, or is it a disturbance of control, *i.e.* a dys-function? This is a very difficult question to answer. Can we in general think of a hyper-function of the ductless glands? This hypothesis is becoming extremely shaky. We talk of hyper-thyroidism, but why should the thyroid take upon itself the idea of pouring out more of its secretion, when under the law of economy none of the other glands are certainly known to act thus, with the possible exception of the pituitary? Spontaneous hyper-function of an organ is very difficult to conceive, though we have no proof that the cause is extra-thyroid. The heart, lungs, and liver do not spontaneously hyperfunctionate. Why should the thyroid?

I question on these grounds, which are merely those of physiologic logic, as one might say, whether acromegaly is a real hyper-function, or whether it does not lie in some distortion of this mutual, synergistic action; whether for some unknown and occult reason the mutual aid has been removed to make an even balance of growth in this case, and that certain of these terminal areas of the osseous skeleton have in that way obtained an undue ascendancy in development over the others, as a result of a dys-function. But this is only a vague hypothesis. The truth is not known.

Dr. B. W. Weinberger, New York. Is there a definite age at which the thyroid becomes more active than the thymus? For instance, up to puberty does a certain activity take place in the thymus, and then recur to the thyroid, or is that a false theory?

Dr. Janney. That, I think, touches upon one of the most interesting phases of the whole question. Of course the facts are perfectly well understood. The thymus is apparently predominant during infancy and early childhood, and then its activity fades away. But the later researchers have found that the thymus tissue does not become absorbed and atrophied, as we were taught as students. There are from one to five grams of thymus tissue which remain quite active even to advanced age. This Matti has shown in a table in his excellent monograph on the Thymus. We have reason to believe in clinical medicine that the thymus may again take on its latent powers of control in this metabolic scheme, because when, for instance, the

thyroid is affected, the thymus increases in size. Surgeons take out such thymus glands; but they remove anything striking them as too large.

This calls to mind a very interesting phase of the matter, and that is the relation of the ductless glands to the growth of the embryo. It is becoming known that, as the embryo grows, certain of the ductless glands of the mother undergo hypertrophy. There seems to be a very definite relation between these phenomena, for if the growth of the embryo is stopped, let us suppose by accident, these glands cease hypertrophying. I speak only of certain cases which have been accurately demonstrated.

Then we come to the control of various parts of the body through what may be production of hormones in the embryo itself at that time; for instance, the stimulatory action on the mammary glands during the period of growth of the embryo in the body. That can be pretty definitely explained now as the result of hormone action. I cannot go into this question, but the farther we go, the more we feel that the general body processes, perhaps even the stature itself, are determined by the endocrine organs —not that man should grow to five feet eight inches or six feet in height directly according to the law of the Divine Being, but rather according to the law of the hormones.

The President. When are the ductless glands laid down in the development of the embryo?

Dr. Janney. Very early.

The President. One before the other?

Dr. Janney. Unfortunately, the embryology of the ductless glands has as yet been a neglected study, so that I cannot make exact statements as to their relative development. The thymus, thyroids, and parathyroids begin embryologically as endodermic organs. The chromaffin tissue of the suprarenals and posterior lobe of the hypophysis are neuro-ectodermal. The suprarenal cortex, pancreas insular apparatus, and interstitial glands are mesodermal in origin. There seems to be a certain correlation between parts of the ductless glands which are derived from the same germ layer. For instance, the chromaffin tissue of the suprarenals somewhat resembles in function the posterior lobe of the pituitary.

THE DENTAL COSMOS

A MONTHLY RECORD OF DENTAL SCIENCE.

Devoted to the Interests of the Profession.

EDWARD C. KIRK, D.D.S., Sc.D., LL.D., *Editor.*
L. PIERCE ANTHONY, D.D.S., *Associate Editor.*

PUBLISHED BY THE S. S. WHITE DENTAL MFG. CO., PHILADELPHIA, PA.

SUBSCRIPTION PRICE, including postage, $1.00 a year to all parts of the United States, Hawaiian Islands, the Philippines, Guam, Porto Rico, Virgin Islands, Cuba, and Mexico. Canada, $1.40. To other foreign countries, $1.75 a year.

Original contributions, society reports, and other correspondence intended for publication should be addressed to the EDITOR, Lock Box 1615, Philadelphia, Pa.

Subscriptions and communications relating to advertisements should be addressed to the BUSINESS MANAGER of the DENTAL COSMOS, Lock Box 1615, Philadelphia, Pa.

PHILADELPHIA, FEBRUARY 1918.

EDITORIAL DEPARTMENT

Jesse Cope Green.

[SEE FRONTISPIECE.]

IF it has happened that any other practitioner of dentistry has rounded out one hundred years of human life having devoted sixty-six years of it to the practice of his profession, is now hale and hearty, blessed with unimpaired faculties, with a spirit verdantly young, and still looking hopefully toward the future, we have no record of the fact.

Someone has said that old age is merely a numeral; if so it is purely a relative quantity, for in the present instance even the century mark does not represent old age as measured by the vital status of Dr. Green. A man who at seventy-nine first learned to ride a bicycle, rode it daily for exercise until three years ago, and then discontinued its use only at the earnest solici-

tation of his friends, who regarded it as dangerous practice for him, owing to the general use of the roads by automobiles, is not old in any ordinary acceptation of that term.

Dr. Green was born December 13, 1817, of Quaker parentage, and throughout his life has been a consistent member of the Society of Friends. After the completion of his elementary education, in 1836 he became a school teacher at the Friends' School in West Chester. His tastes and mental tendencies directed his attention to the healing art, and for a time he was undecided as to medicine or dentistry as his life-work. Possessed of strong predilections toward mechanical handicraft, he finally decided to select dentistry for his major life-activity, and accordingly began its study with Dr. Mahlon Gallagher of West Chester as his preceptor. In 1843 Dr. Green purchased the practice of his preceptor, which he actively continued without interruption until his retirement in 1900—a period of sixty-six years. The honorary degree of D.D.S. was conferred upon him by the Pennsylvania College of Dental Surgery in 1865.

The span of Dr. Green's active professional life covers practically the period of the whole professional development of this department of art of healing. He began his studies in dentistry about the time of the establishment of the first fundamental factors of our professional organization. The act incorporating the Baltimore College of Dental Surgery, the first dental educational institution in the world, was passed by the Legislature of Maryland March 9, 1840, and its first class, consisting of Robert Arthur and Covington R. Mackall, was graduated February 1, 1841. The first number of the *American Journal of Dental Science*, the first dental periodical in the world, was issued June 1, 1839, and the American Society of Dental Surgeons, the first national dental association in the world, was organized in New York August 18, 1840.

Not only was Dr. Green's entrance into the dental profession cotemporaneous with these epoch-making events in our history, but he has been an active and interested participant in all of its subsequent evolution. To the majority of those now living, the series of events that in their totality constitute the history of dentistry are known only as they have been recorded, or by tradition; to Dr. Green they are matters of personal experience, and to hear

from the lips of this man of phenomenally tenacious memory the recital of the many activities and incidents pertaining to the formative period of professional dentistry in which he was personally concerned is indeed a remarkable experience.

His point of view with relation to the development of dentistry is not, however, the only or indeed the most striking feature of his unique life experience. His own history covers the period of most intense evolutional development of the human race. All of the great achievements of civilization have been accomplished within his knowledge. Steam navigation, the telegraph, all the devices that make for the rapid intercommunication of peoples and hence for civilization, the conquest of the air, the industrialization of humanity, have all taken place within this man's lifetime.

The dental profession throughout the United States have recognized that the centenary of Dr. Green was an important as well as an unusual event, and besides making him the recipient of numberless letters of congratulation and appreciation, the Chester and Delaware County Dental Society gave him a testimonial banquet at which he was the honored guest and center of interest. He was also the guest of honor at the annual banquet of the Chester County Historical Society on the night of his one-hundredth birthday anniversary, on which occasion he made an interesting and vivacious after-dinner talk, showing no signs of fatigue or physical weakness notwithstanding the fact that the same morning he had addressed an audience of upward of one thousand of his townsfolk and the entire day had been given over to receiving the congratulations of his friends.

His good health and longevity he owes to the philosophic calm and cheerful optimism which are his temperamental characteristics. As he has been heard to phrase it, Dr. Green "sheds trouble." He has never used stimulants, and is an indefatigable worker. Since 1857 he has kept an accurate and uninterrupted daily record of the meteorological conditions in his locality, his records antedating those of the Government signal service, and they are now copied in the archives of that bureau. He is a skilled technician, having made anemometers and rain-gauges of his own design for use in his weather observations. He has found time also to construct several fine microscopes, and tradition "hath it" that no better trout rod has ever been constructed than those made by Dr. Green.

The present writer has known him for nearly forty years, has served with him as a colleague on the Board of State Examiners in Dentistry, has had the privilege of contact with him in social and professional ways and in the closer relations of intimate friendship. The youthfulness of his spirit is perennial; his outlook on life is just as optimistic as it always has been. He is an incontrovertible material demonstration of the axiom that life is good.

As the writer views the privilege accorded to himself in the right to number the subject of this sketch among his friends, his regret is that Dr. Green cannot be personally known to all members of the dental profession, and it is just that regret and the desire that a larger number shall know something, at least, about him that must justify this single departure from our editorial policy to exclude personal matters other than obituaries from our pages.

Proposed Legislation for Navy Dental Corps.

The Legislative Committee of the National Dental Association, under authority of a resolution of the association passed at its late meeting in New York, has prepared a bill providing, for commissioned officers of the Dental Corps of the Navy, the same rank, pay, promotions, and allowances as officers of corresponding grades in the Naval Medical Corps. This bill, designated as S. 3386, was introduced into the Senate by Senator Lodge on January 5, 1918, read twice, and referred to the Senate Committee on Naval Affairs.

The purpose of the bill is obvious. We have secured, after many years of effort, recognition of the status of dentistry by the National Government on a plane of equality with the other medical specialties in so far as dental service in the army is concerned. We must now accomplish the same result with respect to the naval dental service, and with the precedent already established the task should not be difficult. The Legislative Committee asks that members of the dental profession write to the Committees on Naval Affairs of both the Senate and the House, earnestly requesting their support of the bill (S. 3386), and bring such influence as they may be able to command to that end upon

individual members of the committees, the *personnel* of which is as follows:

SENATE NAVAL AFFAIRS COMMITTEE.

Benj. R. Tillman of South Carolina.
Claude A. Swanson of Virginia.
John Walter Smith of Maryland.
Jas. Hamilton Lewis of Illinois.
James D. Phelan of California.
Key Pittman of Nevada.
Thomas J. Walsh of Montana.
Robert F. Broussard of Louisiana.
Peter G. Gerry of Rhode Island.
Park Trammell of Florida.
Boies Penrose of Pennsylvania.
Henry Cabot Lodge of Massachusetts.
William Alden Smith of Michigan.
Carroll S. Page of Vermont.
Miles Poindexter of Washington.
Warren G. Harding of Ohio.
Frederick Hale of Maine.

HOUSE NAVAL AFFAIRS COMMITTEE.

Lemuel P. Padgett of Tennessee.
J. Fred C. Talbott of Maryland.
Albert Estopinal of Louisiana.
Daniel J. Riordan of New York.
Walter L. Hensley of Missouri.
John R. Connelly of Kansas.
William B. Oliver of Alabama.
William W. Venable of Mississippi.
Carl Vinson of Georgia.
Adam B. Littlepage of W. Virginia.
James C. Wilson of Texas.
Thomas S. Butler of Pennsylvania.
William J. Browning of New Jersey.
John R. Farr of Pennsylvania.
Fred A. Britten of Illinois.
Patrick H. Kelley of Michigan.
Sydney R. Mudd of Maryland.

This matter was received too late for insertion of the bill in this issue of the Dental Cosmos. The full text will be given in our March issue.

Review of Current Dental Literature

[*Journal of the American Medical Association*, October 20, 1917.]

The Menace of Mouth Infections. By Oliver T. Osborne.

Osborne is seriously impressed with the potentialities and realities of oral foci of infection. Unfortunately he manifests a sad ignorance of dental thought and practice, and there is a slight suspicion that he is not as sympathetic with the dental profession as some kind words in this article are intended to convey. It would be curious to know to whom this paper was addressed. From its air of condescension one could believe it was delivered to impress thoroughly upon the dentist and the layman the duty of respectfully deferring to the general practitioner's omniscience on matters dental.

Only two passages contain anything in the least original, and these passages are purely incidental to the main line of the author's argument, viz:

"I find that infected teeth and tonsils are frequent causes of thyroid disturbance. Something irritates the gland, and then something else inhibits the result of its increased activity. This is shown by the surgical re-

moval of the source of the mouth infection. I have seen three such instances. In one case the gland became greatly enlarged after the operation, exophthalmos occurred, and a tachycardia of from 140 to 160 developed. Before the operation absolutely no thyroid symptoms were present except a slightly enlarged gland."

"For now nearly two years, at a public tuberculosis institution, we have examined the mouths, corrected the teeth, and removed the sources of infection of every patient who entered the institution, and owing to this preventive treatment we have had less tonsillitis, fewer sore-throats, less indigestion, and less influenza and colds than we had before we began these mouth investigations."

[*Comptes rendus de l'Académie des Sciences*, Paris, October 15, 1917.]

Regeneration of Bone in the Adult. By Heitz-Boyer and Scheikevitch.

The classical view of the periosteum as the reparative agent in osseous injuries and losses is controverted by numerous observations afforded by war wounds. In the adult, the property of bone repair or of bone formation is inherent in the bone itself. It is in the irritated bone affected by an osteitis that there arises the process of ossification. This phenomenon in the adult is therefore exclusively pathological—inflammatory—from beginning to end.

Some extensions of these views into the practical fields of war surgery are—(1) If all else goes well it may be unnecessary to remove splinters and fragments of bone too soon from wounds; their presence there acts as an irritant and accelerates the process of repair; (2) on this basis the paradoxical cure of pseudo-arthroses following the development of an attenuated infection becomes understandable; (3) the mechanism of osseous grafts becomes in part more intelligible, where these are known to occur in the absence of periosteum.

[*Pacific Dental Gazette*, San Francisco, September 1917.]

Impressions for Full Dentures, and a Technique. By G. E. Wilson.

From the modern viewpoint the principles underlying impression-taking may be succinctly stated as follows: With full dentures as large a base-plate area as possible must be covered, the periphery of the denture must extend upon yieldable tissue sufficiently to form a valve-like contact, and there must be contact with the entire area covered by the base-plate.

In other words, an impression to be satisfactory must insure three things—areal contact, peripheral bearing of the base-plate, and extension upon yieldable tissue.

Areal contact means contact over the whole area included within the periphery of the base-plate, but it does not mean uniform pressure over the whole surface of the base-plate. Areal contact can only be secured by a material that flows. Thin mixed plaster best serves this purpose.

To secure peripheral bearing of the base-plate it is best to reinforce peripherally the impression tray with beeswax, over which there is thin plaster. The wax secures the required compression over the desired portions of the impression, and holds the soft tissues firmly and evenly against their bony foundation.

The essential part of a base-plate to be extended on to yieldable tissue in order to obtain retention is the palatal border from the external portion of one tuberosity to the external portion of the other. The palatal extension upon yieldable tissue should be one-eighth to one-fourth inch in width. The direction for the extensions upon the lower denture is upward and upon the upper denture the extension is downward.

[*New York Medical Journal*, November 10 and 17, 1917.]

A Study of Some Functional Inefficiencies of the Teeth Associated with Occlusal Anomalies. By Milo Hellman.

Hellman summarizes a somewhat extended essay in the form of more or less time-worn conclusions: (1) The efficiency of a denture is dependent not only upon the full complement of teeth in normal occlusion, but also upon each tooth being complete in its form, integral in all its parts, and secure in its attachments to the supporting structures. (2) With the loss of one unit of a denture the functional efficiency is reduced to a vastly greater extent than that represented by the relative numerical proportion of the teeth in that denture. (3) The teeth, though vitally

concerned in the mastication of food, constitute at the same time important adjuncts in the perfection of the functions of respiration and of speech. (4) With every digression from the normal in occlusion affecting the process of mastication, there is also a corresponding deviation from the normal in respiration and speech.

Considered as a part of an educational propaganda among the medical profession, the article doubtless is justified. It contains frequent reference to concrete cases, and is very satisfactorily illustrated by many pertinent models.

[*Journal of the National Dental Association*, October 1917.]

Persistent Chronic Apical Inflammation and Its Treatment. By John S. Marshall.

The value of this paper lies in the novelty of the therein outlined method of treatment —novel only in the sense that it is a method of great rarity today, though at least twenty years ago Marshall made it public. The title of that early paper clearly tells the story: "A Plea for the Extraction and Replantation of Teeth for the Cure of Persistent Alveolar Abscess."

The instruments required for this operation are a dental engine, 1 pair of forceps, 2 curets —1 straight, 1 curved—1 one-half inch carborundum stone, 1 spear-pointed drill, and 2 round burs.

Previous to the operation an impression is taken of the region of the tooth in question, and a swaged splint is prepared. Great care must be taken in the extraction of the tooth, avoiding scratching the enamel or fracturing the crown. As soon as the tooth is removed place it in a mercuric chlorid solution (1 : 500 of water) at 103° F., for at least five minutes. (Why Marshall does not suggest substituting one of the hypochlorite solutions for the mercuric chlorid is not apparent. They at least would be well worth the trial.) Curet the socket, irrigate with warm mercuric chlorid, and pack with sterile gauze. Open the tooth through the crown, cleanse the root-canal thoroughly, and remove the diseased portion of the apex. Enlarge the root-canal, and give retentive shape for a gold filling; do likewise for the opening or the cavity in the crown. Irrigate the root-canal with the mercuric chlorid solution, and replace the tooth for at least ten minutes in the solution. Fill the root canal with chloro-percha and gutta-percha points, fill the openings of the apex and the crown with gold. Finish off carefully, as roughness of the root-apex will retard healing. Replace the tooth in the mercuric chlorid solution for at least five minutes. Remove the packing from the alveolus, replant the tooth, and cement the splint in place.

Crowned teeth are not suitable cases for this operation, because of the danger of injuring or breaking the artificial crown in extracting the tooth. This method is also contra-indicated in the case of maxillary molars with divergent roots, and occasionally mandibular molars with convergent roots. The radiograph will give this information.

Theoretically this method possesses merit. Its radicalness insures the removal of an exactly sufficient length of the tooth root, and the proper filling of the canal and closure of the root-apex. Its simplicity facilitates success without as high a degree of technical skill as is required of the operator for the usual method. Finally, this procedure appears to have a much wider range of applicability than is possessed by the more common method. Details, such as the character of antiseptic into which the tooth is immersed and the manner in which the root-canal is filled or the apical opening occluded, may be modified at the discretion of the dentist.

A priori there appears to be no justification for the present unpopularity of the method, and Marshall assures us that clinically a large majority of teeth can thereby be saved and made useful members of the dental economy. In his hands it has proved eminently successful.

[*Lancet*, London, November 17, 1917.]

A Case of Congenital Angioma of the Tongue. By Frank M. Hughes.

This report is merely a brief note. The case concerns a man of twenty-six years. Examination revealed a reddish-blue growth, the size of a large marble, situated on the dorsum of the tongue, well-defined with raised edges, and smooth to the touch. On pressure the growth is reducible in size, but immediate refillment follows release of pressure. No pain has ever been caused by the growth, and

there has never been ulceration or hemorrhage from it. At the age of sixteen years the tumor had became as large as a marble, causing difficulty in mastication. This led to a condition of indigestion which became chronic.

Hughes decided not to remove the growth, as it is of the cavernous type. This would necessitate the loss of a large portion of the tongue and entail the consequent serious impairment of function of that organ.

[*Medicine and Surgery*, St. Louis, May 1917.]

Paralysis of the Facialis Caused by Salvarsan. By D. W. Montgomery and G. D. Culver.

Salvarsan, by virtue of its arsenical content, combines a very slight degree of neurotrophism with a high degree of toxicity toward the treponema pallidum. The case here reported involved profound paralysis of both facial nerves, with a less marked implication of several other nerves and nerve systems.

In the patient, referred for anti-syphilitic treatment, there was a gradual increase in the incidence of disagreeable reactions, progressing evenly with the administration of the drug. A tentative explanation of this apparent "idiosyncrasy" is to regard these nerve affections as a repercussion on the nerves by the syphilitic virus consequent on giving salvarsan. The occurrence of such an accident as that recorded here, as it usually occurs in the early stages of syphilis and after the administration of salvarsan, would indicate some interlocking effect between the infective agent and the salvarsan.

[*Science*, December 21, 1917.]

Why Chloroform is a More Powerful and Dangerous Anesthetic than Ether. By W. E. Burge.

It is a common observation that the amount of chloroform necessary to produce deep narcosis is less than that of ether, and that the period between slight and deep anesthesia is shorter and the lethal dose smaller with chloroform than with ether. Acidosis, resulting from the decreased oxidation in anesthesia, is much more likely to occur, and to a greater extent with chloroform than with ether.

The author adduces some evidence that makes it probable that catalase (an enzyme in the tissues which possesses the property of liberating oxygen from hydrogen dioxid) is the enzyme in the body principally responsible for oxidation.

The decreased oxidation in anesthesia, and the probable importance of catalase in oxidation, suggested the solving of the problem in the title by determining whether catalase is decreased more quickly and more extensively during chloroform anesthesia than during ether anesthesia, parallel with the greater decrease in oxidation and the quicker and more powerful action of chloroform. Cats were used in the experiments.

Ether produced a gradual decrease in the catalase produced, while chloroform produced a very abrupt decrease during the first fifteen minutes of narcosis. "The more powerful and dangerous effect of chloroform as an anesthetic is attributed to the fact that chloroform is more potent than ether in producing a decrease in catalase, both by direct destruction of the catalase of the blood and by injuring the liver, thus decreasing the output of catalase from this organ, with resulting decrease in oxidation. The specific action of anesthetics on the nervous system, according to this hypothesis, is due to the greater solubility of the lipoids of nervous tissue, which facilitates the entrance of the narcotic into the nerve cell, and thus exposes the contained catalase more directly to the destructive action of the drug."

[*International Journal of Surgery*, December 1917.]

Significance of Dental Stigmata. By J. S. Wall.

Wall (*Arch. of Pediatrics*, October 1917) emphasizes the great importance of changes in the first permanent molar in the diagnosis of congenital syphilis. The changes in this tooth may be the only dental deformities in some instances, and are sufficiently characteristic to present no diagnostic difficulties. There is an erosion, not the erosion of wear only, but a disintegration of the grinding surface, to which this term is applied in the absence of a better one. This erosion is irregular in form; the surface of the molar for a third or a half or even the whole of its surface is pitted, excavated, and discolored. There is often a pulpy looking mass of a dirty yellow color occupying most of the face of the crown.

margined, as it were, by the line of cusps ordinarily found on the molar teeth. The tooth has been called the "honeycombed molar of hereditary syphilis." Wall also speaks of it as the "mulberry molar," likening the worm-eaten center of the cutting surface to the appearance of the tip of a mulberry.

[*New York Medical Journal*, November 10, 1917.]

Tuberculoma of the Tongue. By Carl E. Munger.

The case was that of a man, age thirty years. On the dorsum of the tongue, at the junction of the middle and posterior thirds, in the median line there was a crateriform cavity. In this respect the case markedly deviated from the usually reported situation of tubercular lesions of the tongue; almost invariably these occur either on the tip or sides. This lesion being on the dorsum occupied a site on which usually a gumma is found. At the bottom of the crater there there was a marked ulceration covered with a yellowish slimy secretion, and from the central ulceration were narrow, sharply marked ulcerations radiating to the circumference of the thickened and indurated mass, whose surface color was yellowish. The slightest pressure conditioned an exquisite tenderness with much pain at every movement of the tongue. This pain was localized and not radiating when the tongue was at rest. There was present also the condition known as nigrities. If the condition were primary and strictly local, or if even accompanied by an ameliorating systemic infection, the prognosis would be favorable.

[*Journal of the National Dental Association*, September 1917.]

The Present Status of Dental Bacteriology. By K. F. Meyer.

This is a valuable attempt to analyze and correlate the data already published on this extremely broad and refractory topic. Meyer's article would be justified, if by nothing else, at least by the wealth of reference to original publications. What is pertinent to oral bacteriology in these references is often purely incidental to the main line of thought of the investigator. This paper emphasizes the modern need of a thorough resurvey of oral fauna and flora by the most approved current methods and standards.

The plan of Meyer's summary consists of 4 topics: (1) Bacteriology and protozoölogy of the mouth cavity; (2) microbiologic studies in relation to dental caries; (3) bacteriology of oral abscesses, chronic periosteitis and osteitis dentalis, and their importance as foci of systemic disease; (4) the etiology of pyorrhea alveolaris from the viewpoint of recent bacteriologic and protozoölogic studies.

Under the first topic the principal generalities may be stated as follows: The bacterial content of a clean mouth, on account of the neutral or slightly alkaline reaction, is aerobic and facultative anaerobic, and poor in true saprogenic organisms; in a dirty mouth the saliva is alkaline and favors the growth of anaerobes, and therefore putrefaction is evident; the oral organisms have a well-adapted idiosyncrasy for the buccal cavity, and are found outside this cavity only under pathogenic conditions, and then never in the intestines. Under pathologic conditions a shifting of the relative numerical distribution of one or of several types of bacteria of the normal mouth may occur.

The section on dental caries is essentially an exposition of Kliger's work (*Journ. Allied Dental Societies*, 1915). Meyer's paper was prepared before the appearance of Howe's studies in the Cosmos (October 1917, vol. lix, p. 961).

From a consideration of the data collected under the third category, Meyer concludes that the experimental proofs that the microflora of chronic foci of infection play a very important rôle in the causation of systemic diseases are not as yet entirely convincing. It is absolutely erroneous to conclude that chronic alveolar periosteitis and osteitis always represent a potential menace to the health of the human body. Predisposing factors, like pre- or co existing disease, fatigue, etc., are vastly more important than most dentists realize. One should always suspect the presence of a pre-existing disease as an underlying factor in oral sepsis before mutilating dental operations are undertaken.

Naturally, under the fourth topic, some attention is given to the protozoölogy of pyorrhea alveolaris. Meyer believes that the final verdict will be that Endamœba gingivalis has no causal connection with pyorrhea, or that it

is one of many factors responsible for that condition. It is the impression of the author that probably only bacteria common to the oral cavity will be found, and that their relation to pyorrhea is the same as stated for the apical abscesses—namely, the mere presence of these bacteria means nothing, but it attains pathologic significance in this relation when associated with what is generally designated as lack of resistance (from local irritation at the gingival margin or poor nutrition and ill health).

[*Presse Médicale*, Paris, August 9, 1917.]

Cartilage Transplantation in Extensive Wounds of the Lower Jaw. By Morestin.

This is a report of five cases where, to make good extensive losses of tissue, transplants of costal cartilage were resorted to. The results were successful. Eight to ten months after transplantation none of the transplants showed any tendency toward resorption. Esthetically the results were gratifying, and functionally the condition was much better than it could have been without the procedure. In all cases there had been double or greatly comminuted fractures, together with widespread injuries of the soft parts.

[*Medicine and Surgery*, St. Louis, March 1917.]

Septic Parotitis. By V. P. Blair.

The data from seven personal cases are correlated. From a general viewpoint there is a certain similarity between the calculous disease and septic infections of the ducts of the salivary glands and the same diseases in the bile and other excretory ducts, and it is not improbable that the different manifestations of salivary duct irritation and inflammation are as closely related to each other as are those of the bile ducts. The symptoms are essentially obstructive, with an intermittent flow of saliva or of pus and saliva. It may be that a number of cases reported as intermittent swellings, tumors, hernia, recurrent enlargement, etc., of the salivary glands are cases of actual stone irritation or obstruction. The presence of stone is not always easy to detect. In the submaxillary ducts the presence of stone is apt to dominate the picture, while in the parotid, in the absence of demonstrable stone, it is the obstruction, and possibly the inflammation, upon which attention is focused.

Another phase of this subject is that of acute septic infection of the salivary glands, frequently described as secondary or metastatic abscess. Recent opinion has been gravitating away from this view to that which holds that most, if not all, of these cases were ascending infections of the excretory ducts. However, the seven cases described and analyzed in brief by Blair "lead one to think that possibly the older surgeons were not wrong in their metastatic conception of this particular phase of parotid infection."

The treatment is outlined, but this does not permit of abbreviation.

[*Lancet*, London, December 8, 1917.]

Two Cases Illustrating Plastic and Dental Operations. By H. D. Gillies.

A Few Notes on the Treatment of Gunshot Wounds of the Mandible and Maxilla. By W. Kelsey Fry.

[*American Journal of Surgery*, New York, December 1917.]

Healing of Lower Jawbone Defects in War Cripples. By J. F. S. Esser.

In an editorial in the *Lancet* of December 15, 1917, attention is focused upon the first two of the titles given above. The following remarks are of more than passing interest. In the carrying out of the procedures for the repair of the jaws and of the overlying soft parts the fundamental principle must be grasped that the surgeon and the dental surgeon should participate in the work, if the best results are to be obtained. The skilled assistance of the dental surgeon is necessary to obtain perfect replacement of the fragments; the co-operation of the two is essential. Fragments of the bone almost separated from the soft tissues may survive and assist in the union of the bone, and it is therefore of great importance not to remove unnecessarily any pieces which give the least hope of survival.

It is only the first case of Gillies' article which bears upon the work of the military dental surgeon. The case history is given in considerable detail, including the surgical procedure; six photographs facilitate its visualization. The author describes this case as a re-formation of the chin and lower lip by

double-pedicled bridge flaps and cartilage graft. The notable peculiarity of this treatment is the employment of double-pedicled bridge flaps for plastic operations. This is a broad band, left attached at the two ends, turned down into the new position, and there fixed by sutures. The flap benefits by the double blood supply, so that the risk of sloughing is markedly reduced.

Fry's paper illustrates the value of co-operation between the surgeon and the dental surgeon. It deals especially with fractures of the upper jaw. The skin of the face must be supported in the right position. "Here the art of the dental surgeon comes into play, for only by means of a prosthetic appliance can the appearance of the face be regained."

In Esser's opinion, in plastic operations a free transplantation is at best a makeshift when no way is possible to perform a plastic with a pedicle. Until the final results of the free bone transplantation are settled, Esser prefers to apply when possible a local plastic. It would be wrong to use deliberately a free bone piece without any vascular connection when a richly vascularized pedicled bone piece is available. In Esser's operations the bone piece to be placed in the defect was removed with a flap that contained all its soft covering parts (skin, muscles, and periosteum). No metal suture of the bone or wedges are used, but only three thin catgut stitches of the periosteum, and then very strong suture of the soft parts and skin. The full thickness has, in addition to the principal purpose of supplying the ideal nourishment of the bone, also the important practical consideration of cosmetic effect.

In no case treated in Esser's way did the bone piece necrose or form a sequestrum.

[*Journal of the National Dental Association*, September 1917.]

Studies Upon Dental Caries. By Percy R. Howe and Helen H. Gillette.

The report here made is supplementary to that printed in the Dental Cosmos (October 1917, vol. lix, p. 961). The work was done upon children. The results of this investigation support the ideas of Kliger to the effect that in caries the character of the oral flora is changed from a streptococcal to an acid rod and thread flora.

The cultures were kept under aerobic conditions. No colonies were isolated for detailed taxonomic study. The purpose was solely to gain a knowledge of comparative numbers of organisms in two types of cases, those entirely free from caries and those in which there were large numbers of decayed teeth.

The work is summarized as follows: (1) The number of organisms found in a known weight of material scraped from tooth surfaces in uncared-for mouths in which caries is present, as determined by counting plates incubated aerobically, does not vary significantly from the number of organisms found in uncared-for immune mouths. (2) Plates made from deposits obtained from carious mouths showed in general larger colonies, among them yeast forms, than those made from the deposits obtained from non-carious mouths. (3) Titrations of maltose broth cultures showed a noticeable difference in the power of acid production in the two types of cases, the factor per organism for the carious type being about five times as great as for the non-carious type.

The data from these researches show rather strikingly that as far as aerobic organisms are concerned the numbers of bacteria in the mouth are directly proportional to the amount of deposit present, regardless of the presence of caries. The difference between the flora of immune and carious mouths, as indicated by the acid production and difference in appearance of the colonies, is chiefly a qualitative difference. There is a predominance of organisms capable of producing larger quantities of acid when caries is present than when there is no caries.

[*Journal of Experimental Medicine*, Baltimore, January 1, 1917.]

The Localization of Streptococcus Viridans. By H. K. Detweiler and H. B. Maitland.

This work was suggested by Rosenow's views that different strains of the same organism possess distinct localizing power—selective affinity. The strains employed were secured from cases of endocarditis by blood culture, from affected valves, from appendices, from tonsils, from apices of teeth, and from pyorrhea pockets. Rabbits were the experimental animals.

There were nine strains used, which had

been isolated from dental abscesses and pyorrhea. Twenty rabbits were employed. Although the largest percentage of lesions is in the heart, there is a wide variation of organs attacked. One strain from an alveolar abscess produced focal glomerular nephritis in each of three rabbits.

Taking the results of these studies *in toto*, regardless of the origin or age of the strain, we find most lesions in the myocardium, followed closely by the endocardium and joints.

The authors conclude that these experiments do not substantiate in full the theory of the power of selective action of streptococcus viridans. A few strains showed a remarkable constancy in location and type of lesion, but these strains were greatly in the minority. The location of the lesions in animals seemed to bear no relation to the origin of the organism or to the lesions produced by it in the patient from which the strain was obtained.

[*Journal of the National Dental Association.* October 1917.]

The Microscopic Anatomy of Chronic Periodontitis and the Pathogenesis of Dental Root-cysts. By A. T. Henrici and T. B. Hartzell.

It is the purpose of this paper to supply an adequate description of the microscopic anatomy of chronic infections of the alveolar process. The data are drawn from a review of the literature, principally German, on this subject, and from material supplied by autopsies and operations. Ground sections of jaws with the teeth and soft tissues *in situ* were prepared, and also a number of paraffin sections of gingival tissues and alveolar granulomata and cysts.

The authors note the gingival trough, and consider it analogous to the tonsillar crypts and vermiform appendix in the sense of a locus for the accumulation of putrescible material. The earliest changes in pyorrhea occur in that portion of the subepithelial fibrous tissue lying just beneath the base of the gingival trough (or crevice). No pus cells are present, but small mononuclears are numerous, of which the vast majority are plasma cells. The only other changes noted in this initial stage are distended, new-formed, thin-walled capillaries. The inflammatory reaction is of a subacute character.

Sections of a more advanced stage of this form of periodontitis show a far more extensive infiltration of the fibrous tissues of the gum and periodontal ligament, with plasma cells and a few lymphocytes. The ulceration and suppuration are purely secondary events of pyorrhea. The pathological process remains localized to the periodontal ligament because that structure is relatively poorer in blood supply, and, what is more important, that structure is full of lymphatic channels determining the extension of the lesion. These lymphatics may also serve to explain the occurrence of lateral abscesses, which have hitherto been considered the result of hematogenous infection.

The differences between pyorrhea and apical abscess are only those of location. Both are associated with the same mouth streptococcus, invading on the one hand through the gingival trough, on the other through the root-canal. Both are inflammatory lesions of the periodontal ligament, involving in the one case primarily that portion which surrounds the neck of the tooth, and in the other primarily that which surrounds the apex. In both the processes are the same—a chronic progressive granulomatous inflammation characterized by identical cellular elements.

PERISCOPE

Cleaning Rubber Files.—Pour chloroform over the file, which causes the embedded rubber to curl up and loosen. Then take any kind of a stiff brush and remove the rubber, leaving a file that is as good as new.—L. N. ROUBERT. *Dental Review.*

Plaster Models.—Many good models are spoiled by placing the wet bite back on the model. Dry the wax with a doily or compressed air each time you take it from the mouth wet with saliva, and you will not spoil the surface of your plaster models, and your plaster will fit better.—HOMER ALMON, *Dental Review.*

Matrix for Synthetic Fillings in Adjoining Approximal Cavities.—Place a piece of soft temporary stopping between a folded celluloid strip. Put the strip between teeth with the stopping on the lingual surface, and draw both ends forward, molding the soft stopping to the lingual surface. Insert fillings, then hold back both ends.—F. G. LEVENHAGEN. *Dental Review.*

To Increase Efficiency of Local Anesthetic Solutions.—The addition of adrenalin chlorid (20 drops of the 1 : 1000 sol. to the ounce of local anesthetic solution) does three things: (1) Renders the operative field comparatively bloodless; (2) greatly intensifies and prolongs the anesthetic effect; (3) renders the solution much less toxic by retarding its absorption into the systemic circulation.—P. G. PUTERBAUGH, *Dental Review.*

Impression Help.—When making a maxillary impression of an edentulous case with modeling compound, it seems as though we were going to be defeated in getting it to stick. After all the details have been taken care of, very carefully heat the rim and posterior border slightly, introduce into the mouth with care, and carry it to place. Now instruct the patient to suck, as it were, on a straw immersed in syrup. This muscular and tongue effort on the part of the patient will turn the trick as nothing else can. The results are most satisfying.—*Pacific Dental Gazette.*

Patching Faulty Fillings and Crowns.—Of all things that are productive of bad results, I believe the greatest is patching. I firmly believe that 90 per cent. of all the patching of faulty fillings, bad crowns, and other defective operations are the forerunners of future trouble, many of which result in the loss of the pulp. Our filling operations should be made and can be made enduring. They should be permanent operations lasting practically a lifetime.—F. W. GETHRO, *Dental Review.*

The Paraffin Treatment of Burns.—Surg.-Col. Hurd, in the *Lancet*, June 2d. states that he has used a preparation made according to the following formula for nearly a year, with highly satisfactory results:

Resin,	1 part.
Beeswax,	1 part.
Paraffin,	4 parts.

Melt in a dish set in boiling water for half an hour. Apply with a metal spray to form a thick layer on the affected surface. Next cover with a very thin layer of cotton, while the wax is still hot, and then with a camel's-hair brush paint on three or four layers of the wax. After it has hardened for ten minutes, bandage.—*Amer. Journ. of Pharmacy.*

Ambrine.—This much advertised French preparation, which has been recommended so highly for burns, consists principally of hard paraffin, to which its efficacy is entirely due. Like many proprietary preparations of a secret nature, its composition is not always constant. It consists essentially of a hard paraffin combined with a small quantity of an asphalt-like body, with which combination a fatty oil has been incorporated. Undoubtedly a number of commercial paraffins on the market even without admixture of other substances will be found to answer just as well, in fact some observers have found them decidedly superior to ambrine. There is no reason why a simple paraffin wax, with a melting-point of between 44° and 48° C., should not answer every requirement for making these paraffin films.—*Journ. A. M. A.*

An Amalgam Carrier.—The best amalgam carrier is found in every dental office, if the operator knows how to use it. Any serrated amalgam plugger may be used as a carrier. The alloy is mixed as usual, not too dry, and is cut in small pieces. Touch these lightly with the pluggers you intend to use. You will find that the amalgam adheres sufficiently to allow it to be carried to the cavity. The secret is not to press too hard on the plugger or the alloy will not adhere, but instead the pressure tends to burnish it. A little practice will enable anyone to use this technique, effecting considerable saving in time and in instruments.—H. L. BROWNELL, *Pacific Dental Gazette.*

Use of Arsenic for Destroying Pulps.—My experience with arsenic as a safe destroyer of pulps was shattered many years ago, and my continued observations and study of this subject strongly confirm this previous opinion. Note that I designate this as an opinion. Nothing definite has been given to the dental profession as to whether arsenical destruction of the pulp is or is not responsible for many of the injuries to the peridental membrane at the apices of the roots. We all know what arsenic will do when it leaks through a temporary filling or when it reaches a false opening in root-canals or pulp chamber. The great destruction wrought in these cases seems to show beyond question that it is not self-limiting, and also shows very conclusively that it is an extremely dangerous drug. Many of the best men in the profession have abandoned the use of arsenic, and I firmly believe that before many years it will be eliminated by all the best-informed dental practitioners.—F. W. GETHRO, *Dental Review.*

Substitute for Platinized Gold Backing.—The purpose of using the platinized gold backing is to maintain the bluish hue at the tip of the porcelain facing, and to facilitate the flow of the solder without burning up the backing. There is, however, a serious objection to the use of the platinized gold backing, namely, platinum has a tendency to draw away from the porcelain, unless carefully overlapped, and often chips the incisal edge of the facing, due to the difference in thermal conductivity.

The use of La Croix china paint to modify the shade of porcelain is nothing new, but its use as a substitute for the platinized gold backing is original as far as the writer is concerned.

Blue china paint diluted with lavender oil is painted with a small camel's hair brush on the lingual surface of the facing, and the pure gold backing is tried on. If the color is not correct, the china paint may be changed until it is the desired shade. The tooth can now be backed with gold in the usual way. The china paint will be sufficiently baked during the soldering process.—Y. HAYASHI, *Dental Digest.*

Indications for Gold Fillings.—The paramount issue in filling operations is to restore and preserve the tooth to its health and function for the greatest possible length of time. Gold foil, therefore, becomes so universally indicated in the ordinary cases that it becomes easier to name those cases where it is not indicated than to define those where it is. We should say gold foil is not indicated in the following cases: Where the tooth has become loosened from peridental diseases. Where extensive decay has almost completely destroyed the crown of the tooth. In a limited number of cases in the anterior teeth where cosmetics becomes the all-important consideration. In debilitated patients who are unable to be in the chair for more than a brief period of time. These patients are fortunately very few. In a very few surfaces on the molar teeth which are inaccessible. A very limited number of cases where caries have so nearly involved the dental pulp that its preservation becomes a matter of doubt. In these cases temporary plastics should be employed until such time as the destiny of the dental pulp can be more definitely prognosticated.—J. M. PRIME, *Minneapolis District Dental Journal.*

The Use of Dakin's Solution for Abscessed Teeth.—The patient was a young man, twenty-two years of age, with a chronic alveolar abscess extending from the lower first bicuspid to and including the third molar, with involvement of the alveolar process, a portion of which was necrosed, with pus burrowing down through a fistula near the angle of the jaw. It resisted all other treatment for a period of nearly two years. At the present time the abscess is closing up, discharge of pus *nil*, new granulations forming, and if nothing unforeseen develops, I am confident the case will be completely cured in about two weeks' more time.

Method of treatment. (1) I secure a fresh solution each week from a druggist (this is absolutely necessary). The druggist makes it up for me, and it is important not to get the solution too strong, as it will then produce irritation. (2) I secure a glass syringe (keep sterile) and syringe out the fistula

and all pus tracts thoroughly every day—the more and oftener you syringe the solution through the fistulas the quicker the results. (3) I give the patient a bottle of Dakin's solution to carry with him to work, and he uses it as a mouthwash, and forces it through the fistula himself several times daily, as the more it is used the better will be results. Keep sterile cotton over the opening on the outside of the jaw.—P. L. MARSHALL, *Dental Summary.*

Uselessness of Vaccines and Emetin in the Treatment of Pyorrhea.—Regarding the bacteriology of pyorrhea, it can be said that at present there is no evidence that it is caused by a specific bacterium; on the contrary, there is plenty of evidence that it is not. Studies of the bacterial flora of pyorrhea have shown that it does not differ qualitatively from that of the normal mouth. As might be expected there is a great quantitative difference inasmuch as pyorrheal conditions are conducive to bacterial growth. Investigations carried on at the Research Laboratories of the New York Health Department through my initiative have proved this beyond question. They showed, moreover, the extraordinary complexity of the bacterial flora of pyorrheal lesions; spirochetes and fusiform bacilli preponderated. No less than fifteen different strains of the latter were isolated and carefully studied, and nothing distinctive of pyorrhea was found. Cocci of every known strain were found as were many other morphological types. Comparisons with cultures taken from normal mouths were made only to find that the same organisms were to be met with, but in greatly reduced number, showing the difference to be purely a quantitative one. The use, therefore, of vaccines in the treatment of pyorrhea is illogical in the extreme. The same may be said of emetin. While it is an efficient amœbicide, and will destroy amœbæ, which are always present in pyorrheal lesions (as they are in every filthy mouth), it has no curative effect.—A. H. MERRITT, *New Jersey Dental Journal.*

Gold Foil Fillings for Restoring Tooth Form.—Cohesive gold foil is the king of filling materials, and with it the very valuable tooth forms may be wonderfully well reproduced. In the restoration of the normal occlusal forms this material works most beautifully. The grooves, pits, incline planes, and cusps are easily reproduced with small pellets, using the various plugger points as the operation is built up and finished. No more beautiful forms are possible in inlays or amalgam than may be made with this unique filling material. The other surfaces, so vital to physiological function, are likewise as easily and positively reproduced.

It is not the purpose of the writer to condemn the porcelain or gold inlay. Both the direct and indirect methods hold many possibilities. We should dislike to part with them in our practice. We are not in any sense condemning the use of amalgam. We consider it a valuable filling material, and would not want to practice without it. This is what we do wish to emphasize: That gold foil is not a "lost art," but when properly understood will rapidly come to its own. Already the disgraceful results of easy slipshod methods are becoming apparent. Interest everywhere is becoming aroused for safer, saner, and surer methods. Cohesive gold foil offers a surer and safer method in a wide range of cavities. Gold-foil technique should be thoroughly mastered in our colleges, demonstrated in our societies, taught in our study clubs, and more generally employed in our offices.—J. M. PRIME, *Minneapolis District Dental Journal.*

Treatment of Active Hyperemia of the Pulp.—The treatment of this condition consists in protecting the tooth from the irritant which caused the disease. If a cavity exists which is causing the trouble an anodyne remedy is indicated. One treatment with phenol compound, or other remedies possessing similar properties, should cure a case of active hyperemia due to caries of the tooth. At the second sitting, if the case has a favorable history, the rubber dam should be adjusted and the dressing and carious dentin removed, after which a base of cement may be inserted, the cavity prepared, and the tooth filled. In those cases where the cavity is deep and encroaches upon the pulp, and where the removal of the softened dentin practically exposes the organ, it is necessary, in order to save the pulp, to protect it by the use of some antiseptic paste. Here I use thymolized calcium phosphate as the powder and oil of cloves as the liquid to make such a paste. Just a little aristol or europhen—iodin compounds—is added to the paste after it is mixed to the proper consistence, which should be like softened gelatin. In cases of actual exposure, the pulp should be destroyed and removed, unless some exceptional reason obtains for preserving the life and functionating powers of the organ; and even in cases of near exposure, one must be careful that the pulp is acutely alive and normal, for in many cases it simply dies without the manifestation

of the usual pathologic symptoms. Such stimuli as heat, cold, and electricity may be used to test the acuteness of the vitality of the pulp. Should it fail to respond to these tests, or should it ache severely without ceasing momentarily, it had better be removed.—J. P. BUCKLEY, *Dental Review.*

Nerve Blocking.—The advantages of nerve blocking are numerous, but the following will serve as suggestions of some of the most important:

(1) The duration may be changed by varying the amount of the vaso-constricting agent. The long duration is of great value to the operator for the removal of impacted third molars, reducing fractures, treating the antrum, root amputation, removal of tumors, cavity preparation, removal of pulps, and many other similar operations which may come within the observation and practice of the oral surgeon or general practitioner.

(2) Large or small areas may be anesthetized, depending upon the nerve branch or branches blocked.

(3) Anesthesia is secured in infected or inflamed areas by blocking the nerve branch at a point some distance from the operative field, and in the healthy tissue.

(4) Nerve-blocking injections, when skilfully made, are without pain, for the reason that the needle is inserted and the solution injected in the mucous membrane and in loose connective tissue.

(5) One or two insertions of the needle will block the operative field, depending, however, upon the nature of the operation and the area to be blocked.

(6) Co-operation of the patient. It is well known that this is of material advantage to the operator, because he can operate with ease and complete the operation on the patient with a minimum amount of laceration, and without the inspiration of blood and mucus.—ARTHUR E. SMITH, *Minneapolis District Dental Journal.*

Matrices for Amalgam.—For amalgam we wish a matrix which will conform closely to the general outline of the tooth, which is thin, yet strong and pliable, and wide enough to extend beyond the gingival and occlusal margins of the cavity; and finally, one which can be quickly adjusted and easily removed with the minimum of danger to the filling.

The materials used in this clinic, Angle's C and H band material, particularly C, will be found very useful in the majority of cases requiring matrices.

Having secured the necessary separation and prepared the cavity (Black's preparation preferred), a piece of band material is cut which will be long enough to extend halfway around the tooth—entirely around if preferred. Hold this in position on the tooth and mark the contact point. Contour the band at this point. Make two ears on the gingival margin of the band, one buccally and one lingually, and through these ears and around the matrix pass a piece of dental floss. Place the matrix on the tooth and ligate tightly, passing the ligature around twice if necessary, and tying with a surgeon's knot. Burnish the matrix around the edges of the cavity to assure close adaptation. Cotton may be packed between the teeth to assist in resisting the pressure while inserting the filling. Having inserted the filling, cut the ligature holding the matrix, grasp one end of the matrix in a pair of pliers, and gently pull down and out. The filling will have a smooth surface and can be easily and quickly trimmed, contoured, and polished.—L. C. BROWNTON, *Journ. Cal. State Dental Association.*

Advantages of Phenol-Sulfonic Acid in the Treatment of Pulpless Teeth.—The chemical action of sulfuric acid and phenol-sulfonic acid for the use under consideration is practically the same; and they will be discussed here conjointly. Personally, I prefer phenol-sulfonic acid. Its consistence is thick and syrupy in the 80 per cent. strength which is recommended; thus a drop will adhere to the end of the broach or other applicator, permitting it to be carried even into the canals of upper teeth without difficulty. The acid does not materially affect a broach, and if any of it accidentally gets on the enamel of the crown of the tooth and is not noticed for a time, it does not decalcify and whiten the spot to the extent that sulfuric acid would do. It might be supposed by those who have not used phenol-sulfonic acid that, possessing the above-mentioned advantages over plain sulfuric acid, it would be less effective in the canal. I have not found this to be the case. The agent has one possible disadvantage. In using either of these acids, after they have been introduced into the canal for a time and the walls thereof filed with a suitable broach, they should be neutralized with a solution of sodium bicarbonate. In the case of sulfuric acid the salt formed as a result of the reaction is sodium sulfate, a freely soluble salt. With phenol-sulfonic acid the salt formed is sodium phenol-sulfonate, which is not as soluble as sodium sulfate. I can conceive how it might be possible in a very fine canal to temporarily block it with the salt

formed. An excess of water would readily dissolve the salt, or by using a solution of sodium bicarbonate of not more than 10 per cent. strength the salt would be dissolved as soon as formed by the reaction. This is a thing which probably would never occur in practice; but I mention it as a possible disadvantage.—J. P. BUCKLEY, *Dental Review.*

Muscle Trimming.—An easy way of performing muscle trimming is as follows: Warm the left buccal margin of the impression material over the flame, dip into hot water, and lift up the left cheek so as not to distort the soft margins while inserting the impression tray into the mouth. Instruct the patient to close the mouth; this will bring the buccinator muscle to the middle position. Then ask the patient to open the mouth: this will bring the muscle to the posterior position. Instruct the patient in the whistling and laughing motions, which will muscle-trim in the anterior position, and immediately massage over the cheek. Cool the tray with a spray of cold water to hasten the hardening of the compound. Then warm the buccal margin on the right side of the impression, and repeat as on the left side. Next warm the labial margin, ask the patient to perform the whistling motion, and then massage over the lip.

The next step is to have the tuberosities well covered. If any part of the impression at these points is deficient, add compound, and use the finger to help carry the compound over the tuberosities.

The next step is to adapt the impression to the soft tissues of the palate. These tissues should be in a relaxed position when the adjustment is made. This is accomplished by adding compound over the entire area occupied by these tissues. Pass this part of the surface over a gas flame, dip into hot water, insert in the mouth, and instruct the patient to swallow two or three times. During the act of swallowing, the tongue is automatically carried to the roof of the mouth, and tends to drive the softened compound into firm contact with the soft tissues. Pass the right forefinger across the heel of the tray, and with firm pressure help the compound to adapt itself firmly to the soft palate and tuberosities. Immediately have the patient close the mouth and swallow.

According to Dr. Greene an upper plate should fit snugly, but should not be uncomfortably tight. A plate which can be rotated slightly from side to side without breaking suction is preferable to one very firmly fixed in the mouth.—J. ADER, *American Dentist.*

Dentistry Twenty Years Ago and Today.

TWENTY YEARS AGO.

Dentists were using cataphoresis for alleviating pain.

Somnoform was unknown.

"Iron-pin" teeth made their appearance.

Porcelain workers were coming into their own.

Orthodontist and exodontist were words used to scare children.

Focal infection was not thought of.

Platinum sold at $11 per ounce.

Prophylaxis was a word only few could even pronounce.

Gas was administered through a drum containing water to "purify it."

All the dental laboratories might have been counted on the fingers of two hands.

X-rays were only dreams.

TODAY.

Novocain with conductive anesthesia is the remedy to alleviate pain.

"Palladium pins" in bridge teeth are universally used.

Porcelain workers are beginning to sit up and take notice again.

Every city of 50,000 has its specialist in regulating and extracting.

The danger of focal infection is now so great that thousands of words have been written on the subject, and discussions galore started.

Patients are being taught how to massage their gums, how to brush their teeth, and the value of prophylaxis is generally understood.

Nitrous oxid and oxygen mixed in a highly scientific manner is used freely as an anesthetic, with the best results.

X-rays play an important part in every modern dental office. It's the difference between "know" and "guess."

Over two hundred laboratories now seek to serve the dental profession.—*Nebraska Dental Journal.*

Plaster Impressions of "Partial" Cases.—In an edentulous jaw, any overhanging or moderately undercut parts will in most cases yield sufficiently to permit withdrawal of the impression without fracturing it. In a tooth-bearing jaw, some of the overhanging surfaces are rigid or non-yielding, so that the impression plaster must fracture in one or more places before removal. This difference in the conditions will affect the impression technique in several ways. The attempt to effect simultaneous removal of tray and impression will seldom produce a good impression; even in the case of a young child's mouth, an un-

fractured impression would be incomplete for study purposes. In many tooth-bearing cases an unfractured removal would be impossible.

Leaving the impression *in situ*, the tray is detached and removed, first freeing it, if needful, from any restraining portions of plaster that may overhang its external border. The labial and buccal walls of the impression are then broken away, in as few pieces as may be practicable. This will be difficult when a very roomy and loosely-adapted tray has been used, and relatively easy when, with a well-adapted tray, the line of fracture runs across a thinner layer of plaster. But even with a suitable tray, it is obvious that if it is not pressed properly home into position the layer of plaster along its floor will be unnecessarily thick, and difficult to break.

In a deep gap between leaning teeth the impression plaster will of necessity be thick and difficult to break; it may then have to be cut or notched with a knife to facilitate fracture and removal. Anticipating this difficulty it is better to provide beforehand for its easier solution. That may be done by first securely attaching to the floor of the tray a ridge of wax running mesio-distally along the site of the gap, so that when the tray is removed we have a notch ready formed in the plaster, and sufficiently deep to make fracture easy.—D. M. Shaw, *Dental Record.*

Obituary

Dr. Reuben Hollenback.

Died, Thursday, December 27, 1917, at his home, Shamokin, Pa., from peritonitis, Reuben Hollenback, D.D.S., in his seventy-seventh year.

Dr. Hollenback was born September 1, 1841, in Lower Augusta township, Pennsylvania, the son of Daniel and Elizabeth (Sherry) Hollenback. He obtained his early education in the public schools of Lower Augusta township, and followed the occupations of farming and school-teaching until the year 1864, when he removed to Shamokin, Pa., where he also taught school for several years.

In 1868 Dr. Hollenback began the study of dentistry under the tutorship of Dr. B. F. Van Buskirk of Selinsgrove, Pa. He later entered the Pennsylvania Dental College at Philadelphia, from which he was graduated in 1877. After graduation, Dr. Hollenback returned to Shamokin, and began the practice of dentistry, which he continued until the time of the illness which resulted in his death. He was a member of the Pennsylvania State Dental Society and the Susquehanna Dental Association.

Dr. Hollenback was not only a capable and progressive dentist, but an active and prominent figure in the affairs of his community, which he served for many years as councilman. In this position, by his conscientious attention to detail, he proved himself a most capable public servant. He was also active in religious affairs, having been born and reared in the faith of the Reformed Church, in which he was a regular and faithful attendant at divine worship, as well as a teacher in the Sunday school.

Dr. Hollenback was twice married. His first wife was Miss Dorothy Sober, who died in October 1887, leaving him three children, two of whom, Dr. Hudson Hollenback, a practicing dentist of Mount Carmel, and William S. Hollenback, a merchant of Reading, Pa., survive him.

In December 1888 Dr. Hollenback was married for the second time to Miss Savilla Fidler of Shamokin, who, with two children, also survives him.

The funeral services were held on Monday, December 31st, at his late home, and interment occurred in the family plot at Shamokin cemetery.

Dr. Burford L. Shobe.

Died, October 14, 1917, at his home in Tulsa, Oklahoma, in his fifty-fifth year, Burford L. Shobe, D.D.S.

Dr. Shobe was born in Smith's Grove, Warren County, Ky., February 6, 1863. At the age of eighteen he moved with the family to Wellington, Kans., at which place he took

up the study of dentistry with Dr. Garnette, and was later graduated from the Ohio Dental College. After graduation he located in Garden City, Kans., where he practiced twenty-four years. From Garden City he went to Kansas City, Mo., and entered into the dental supply business. In 1908 he disposed of his interest in the business and moved to Bartlesville, Okla., to resume the practice of dentistry. Five years later he located in Tulsa, Okla., where he was practicing at the time of his death. He is survived by his wife.

Dr. Fred M. Smith.

Died, at his home in Chester, Pa., on Friday, January 11, 1918, in his sixty-fourth year, from dilatation of the heart, Fred M. Smith, D.D.S.

Dr. Smith was born July 22, 1854, in New York State, near Rochester, where he obtained his early education. He began the study of dentistry in 1878, at the Philadelphia Dental College, from which institution he was graduated in 1880. In the same year he began the practice of his profession in Chester, associating himself with the late Dr. Thaddeus Monroe.

Dr. Smith was quite active in dental and civic affairs, being a member of the Pennsylvania State Dental Society, the National Dental Association, as well as of the County Dental Society. He was prominent in Masonic circles, being a member of the Chester Lodge, the Chester Commandery, and had received the thirty-third Masonic degree.

Dr. Smith was married in 1894 to Miss Marietta F. Cloud of Chester, who with his mother survives him.

The funeral services were held Tuesday, January 15th, at his late home, and interment took place in the Chester Rural Cemetery.

Death of Dr. John W. David.

We regret to announce the death of Dr. J. W. David, of Corsicana, Texas, December 29, 1917. A full obituary notice of Dr. David will appear in our next issue.—Ed.

Dental Legislation

Maine Dental Law Providing for Dental Hygienists.

AN ACT

Allowing Dentists to employ Women Assistants who shall be known as Dental Hygienists.

Section 1. Any registered or licensed dentist may employ women assistants who shall be known as dental hygienists. Such dental hygienists may remove lime deposits, accretions, and stains from the exposed surfaces of the teeth and directly beneath the free margin of the gum, but shall not perform any other operation on the teeth or mouth or on any diseased tissues of the mouth. They may operate in the office of any registered or licensed dentist or in any public or private institution under the general supervision of a registered or licensed dentist. The State Board of Dental Examiners may revoke the license of any registered or licensed dentist who shall permit any dental hygienists operating under his supervision to perform any operation other than that permitted under the provisions of this section.

Sec. 2. No person shall enter practice as a dental hygienist in this state until she has passed an examination given her by the Board of Dental Examiners of this state, or a subcommittee of said board which it may appoint, under such rules and regulations as it may deem fit and proper to formulate. The fee for said examination shall be ten dollars, and any applicant failing to pass said examination shall be entitled to one additional examination without further cost. The fee for each re-examination after the first shall be five dollars. The said Board of Dental Examiners shall issue certificates of ability to practice as dental hygienists in this state to those who have passed said examination; *provided*, however, that no person shall be entitled to such certificate unless she shall be eighteen years of age, of good moral character, and shall have had an education equivalent to that attained by one year's attendance upon the class A high schools of this state as defined by section seventy-three of chapter sixteen of the Revised Statutes, and unless she is a graduate of a reputable training-school for dental hygienists or shall present a sworn statement by a dentist licensed to practice dentistry in this state that she has completed a course of at least six months' training as a dental hygienist under him.

Sec. 3. The Board of Dental Examiners of this state may at its discretion without the examination as herein above provided, issue its certificate to any applicant therefor who shall furnish proof satisfactory to said board that she has been duly licensed to practice as a dental hygienist in another state after full compliance with the requirements of its dental laws; *provided*, however, that her professional education shall not be less than that required in this state. Every certificate so given shall state upon its face the grounds upon which it is granted, and the applicant may be required to furnish her proof upon affidavit. The fee for such certificate shall be ten dollars.

Sec. 4. All acts and parts of acts inconsistent herewith are hereby repealed.

Approved April 7, 1917.

This bill, in accordance with the law, became operative ninety days after the adjournment of the Legislature on July 7th, but the Attorney-general of Maine gave it as his opinion that no examinations under this act could be held until six months after July 7th, *i.e.* after January 7, 1918, because the act provides six months' training of the hygienist, and he ruled that this must come *after* July 7th.

ARMY AND NAVY DENTAL NEWS

THE NAVY DENTAL RESERVE CORPS.

Circular issued April 1, 1917, by the Surgeon-general, U. S. Navy

FOR THE INFORMATION OF

Persons Desiring to Enroll in the United States Naval Reserve Force as Dental Officers.

A CANDIDATE for enrollment as a dental officer is first examined for enrollment in the provisional grade of dental surgeon, rank of lieutenant (junior grade), United States Naval Reserve Force. Afterward, if his enrollment is accomplished, should he so desire he makes request for active duty for confirmation in grade, and after the completion of a minimum period of three months' active service (at sea) he is again examined, and if found qualified is recommended for a commission as a dental surgeon, United States Naval Reserve Force.

Legislation establishing the United States Naval Reserve Force contains in substance matter referable to the grade of dental surgeon as follows:

A member must be a citizen of the United States, except as noted below with reference to the Naval Auxiliary Reserve.

A member obligates himself, and may be ordered to serve in the navy throughout a war or during the existence of a national emergency declared by the President, should either arise during his term of enrollment.

A member enrolls or re-enrolls for a term of four years.

In time of peace, and when no national emergency exists, a member may be discharged upon his own request, upon reimbursing the Government for any clothing gratuity that may have been furnished during his current enrollment.

A member is required to take the oath of allegiance to the United States.

A member is given a provisional grade (dental surgeon) upon first enrollment in accordance with his qualifications determined by examination.

A member after enrolling may, in time of peace, upon his own request, be assigned active duty in the navy for such periods of instruction and training as may enable him to qualify for and be confirmed in grade.

For confirmation in grade a member must serve the minimum amount of active service required (three months), and must qualify by examination under regulations prescribed by the Secretary of the Navy.

The minimum active service required for maintaining the efficiency of a member (Naval Coast Defense Reserve) is three months during each term of enrollment. This active service may be in one period or in periods of not less than three weeks each year.

No person shall be appointed or commissioned an officer in any rank in any class of the United States Naval Reserve Force, or promoted to a higher rank therein, unless he shall have been examined and recommended for such appointment, commission, or promotion by a board of three naval officers not below the rank of lieutenant commander, nor until he shall have been found physically qualified by a board of medical officers to perform the duties required in time of war, except that former officers and midshipmen of the navy who shall have left the service under honorable conditions and who shall have enrolled in the United States Naval Reserve

Force may be appointed in the grade and rank last held by them without examination other than the physical examinations herein prescribed.

A member receives retainer pay of $12 per annum while enrolled in a provisional grade, provided he makes such reports concerning his movements and occupation as may be required by the Secretary of the Navy. After confirmation in grade his annual retainer pay is two months' base pay of the corresponding rank in the navy. Retainer pay is in addition to any pay to which a member may be entitled by reason of active service. As noted below, members of the Volunteer Naval Reserve do not receive any retainer pay.

A member who re-enrolls for a term of four years within four months of expiration of last complete enrollment, and who has performed the minimum amount of active service required during the preceding term of enrollment, for each re-enrollment receives an increase of 25 per cent. of his base retainer pay. A member who completes twenty years of service, and who has performed the minimum amount of active service each term of enrollment, on his own application will be retired with rank held, with a cash gratuity equal to the total amount of his retainer pay during his last term of enrollment.

A member may accept employment in any branch of the public service, *except* as an officer or enlisted man in any branch of the military service of the United States or any State thereof.

A member is subject to the laws, regulations, and orders for the government of the regular navy only during such time as he may by law be required to serve in the navy in accordance with his obligation, and when on active service at his own request, and when employed in authorized travel to and from such active service in the navy.

A distinctive badge or button will be issued, to be worn only by members of the United States Naval Reserve Force. A penalty is assigned where unauthorized persons wear or use this emblem.

A member actively employed receives the same pay and allowances, gratuities, and other emoluments as an officer of the naval service on active duty of corresponding rank and of the same length of service. When not actively employed a member is not entitled to pay, bounty, gratuity, or pension, except as expressly provided by the provisions of the act.

When first reporting for active service for training during each period of enrollment officers are credited with a clothing allowance of $50, except as noted below with reference to the Volunteer Naval Reserve. In time of war or national emergency he is credited with $150, less the amount previously credited, if any, during the current enrollment.

Officers in the United States Naval Reserve Force rank with but after officers of corresponding rank in the navy. Officers are commissioned by the President.

Enrollment.

* * * * *

A candidate for enrollment as above must be between twenty-one and forty-four years of age and a citizen of the United States. He must be a graduate of a reputable dental or medical school, legally authorized to confer the degree of doctor of dental surgery.

Application for enrollment must be made in the handwriting of the applicant according to the following form:

FORM OF APPLICATION.

(This form is not to be filled in here, but copied on a separate sheet in the handwriting of the applicant.)

.....

(Residence.)

.....191 .

SIR: I request permission to be examined for enrollment in the provisional grade of dental surgeon, rank of lieutenant, junior grade, Naval Coast Defense Reserve, Class 4, United States Naval Reserve Force.*

I was born at....., and was..... years of age on the .....day of ....., 191 ; graduated from.....dental (medical) school in 19 , and am licensed to practice dentistry in the State of..... I am a citizen of the United States, residing in....., county of....., in the State of.....

I forward herewith letters testifying to my moral character, habits, citizenship, preliminary education, dental education, society membership, license to practice dentistry, and professional qualifications.

Very respectfully,

.....

(Name in full written legibly.)

CHIEF OF THE BUREAU OF MEDICINE AND SURGERY,

Navy Department, Washington, D. C.

---

* When directed, the applicant should substitute the words "Volunteer Naval Reserve for duty in the Naval Coast Defense Reserve, Class 4, United States Naval Reserve Force" for the words "Naval Coast Defense Reserve, Class 4, United States Naval Reserve Force."

The above application must be accompanied by the following certificates:

(*a*) Letters or certificates from two or more persons of good repute, testifying from personal knowledge to good habits and moral character.

(*b*) A certificate or statement from some person of good repute that the applicant is a citizen of the United States. In case the applicant is a naturalized citizen of the United States his naturalization papers, or other satisfactory evidence of citizenship, must be submitted.

(*c*) Certificate of preliminary education. The candidate must submit a certificate of graduation from an accepted high school or an acceptable equivalent.

(*d*) Certificate of dental education. This certificate should give the name of the school and the date of graduation.

(*e*) A certificate from the president or secretary of a state or local dental society to the effect that the applicant is a member in good standing.

(*f*) A certificate of license to practice dentistry.

(*g*) If the candidate has had hospital service or special educational or professional advantages, certificates to this effect, signed by the proper authorities, should also be forwarded.

The applicant will save unnecessary correspondence if he will make sure when submitting his application that the qualifications enumerated above are clearly and plainly described in his letters or certificates.

After passing upon the credentials of the candidate, the Bureau of Medicine and Surgery will issue a permit to the candidate, effective for a stated period, to appear before medical and dental examiners designated by the bureau via the commandant or commanding officer, for his provisional physical and professional examination. The permit will direct the candidate to communicate with the senior examiner as to the date and place of examination. An effort will be made to select the place of examination as near as possible to the place of residence of the candidate.

The Examination.

When a candidate presents himself for examination on the date fixed by the senior examiner, he must bring with him the testimonials as to character, habits, citizenship, preliminary education, dental education, membership in a state or local dental society, license, and letters describing professional qualifications, those forwarded with his application being returned to him for the purpose.

The examination is conducted in the following order: I. Physical. II. Professional.

I. PHYSICAL EXAMINATION.

(See separate circular regarding physical requirements inclosed.)

The physical examination is thorough, and the candidate is required to certify that he is free from all mental, physical, and constitutional defects.

Acuteness of vision, 12/20 for each eye, unaided by glasses, but capable of correction by aid of lenses to 20/20, is obligatory. Color perception must be normal and the teeth good.

If the candidate is found to be physically disqualified the examination is concluded; but, in the case of a candidate otherwise desirable, the examiners may recommend that minor disqualifications or departures from standard be waived, and proceed with the professional examination, subject to final approval by the department. If found to be physically qualified, his examination is continued as follows:

II. PROFESSIONAL EXAMINATION.

1. Letter to the board describing in detail his general and professional education.

2. Examination of diplomas, certificates of state boards, certificates of membership in dental societies, letters, and such other recommendations or certificates bearing upon the professional qualifications of the applicant as he may desire to submit.

3. Oral examination in the several usual subjects in a standard dental course; to include operative dentistry, prosthetic dentistry, and oral hygiene.

A practical examination in operative and prosthetic dentistry may be required.

This examination will be sufficiently comprehensive to determine whether the candidate is qualified to practice dentistry under the usual service conditions.

Due credit will be given for knowledge and experience in the case of candidates who have specialized in certain branches, and the examination may be modified accordingly. A successful candidate, upon the completion of his examination, will be notified by the president of the board that he has been found qualified. The board will assign an average mark based on a passing mark of 75 per cent.

With the consent of the examiners, a candidate may withdraw at any period from fur-

ther examination and may at a future time present himself for re-examination, provided that such examination is not delayed until after the date that his permit would expire.

No allowance will be made for the expenses of persons appearing for examination.

If the medical and dental examiners find the candidate duly qualified physically and professionally for enrollment in the provisional grade of dental surgeon, rank of lieutenant, junior grade, Naval Coast Defense Reserve, Class 4, United States Naval Reserve Force; or Volunteer Naval Reserve for duty in the Naval Coast Defense Reserve, Class 4, United States Naval Reserve Force; they will immediately forward a report and recommendation to this effect direct to the Bureau of Medicine and Surgery, together with the certificate of the candidate as to his physical condition, the personal history and physical data form, and the letter of the candidate to the examiners. A report and recommendation will also be made when a candidate is found disqualified.

After approving the record of examination and the recommendation of the examiners in the case of a qualified candidate, the Bureau of Medicine and Surgery will recommend to the Bureau of Navigation the provisional enrollment of the candidate in the United States Naval Reserve Force.

Upon accepting the certificate of enrollment the candidate is required to take the oath of allegiance and to certify, on oath, as to his citizenship and age.

A member of the United States Naval Reserve Force may transfer to or from the Volunteer Naval Reserve upon approval by the Bureau of Navigation of his request to this effect.

* * * * *

Pay and Allowances.

Dental Officers of the Naval Reserve Force when on active duty receive the pay and allowances of officers of like rank in the navy, the pay of lieutenant (junior grade) being $2000 annually, or $166.66 per month. An increase of 10 per cent. is added when serving at sea or on a foreign station. When on active duty on shore they are also furnished with quarters either in kind, three rooms, or commutation at the rate of $12 per month per room allowed, and fuel and light, or an allowance therefor, are also furnished. When traveling under orders mileage is allowed at the rate of 8 cents per mile.

Dental officers enrolled in the United States Naval Reserve Force shall be appointed in time of peace not to exceed fifty in number.

For further information address the Surgeon-general, U. S. Navy, Navy Department, Washington, D. C.

Dental Treatment in the English Army.

By Capt. W. L. Crocker, R.A.M.C., Hove, Eng.

(Reprinted from the *Journal of the Royal Army Medical Corps.*)

An important aspect of army dental work does not appear to have received the attention it merits. I refer to the modifications of dental treatment that have been the result of experience in the treatment of troops.

All of us, commissioned dental officers and civilian dental surgeons, commenced our work with the idea that every savable tooth should be filled, and every unsavable tooth should be extracted and, if necessary, dentures provided to fill the gaps. Some of us even went so far as to extract on a large scale for the cure of pyorrhea.

At the present time the views of the authorities are clearly laid down, and it is for us to give effect to the instructions in the most intelligent manner we can. The latest instruction points out that stumps are often more useful than dentures. It is stated that only efficient mastication is necessary, but it is not always easy to decide what constitutes efficient mastication. Further, we are told to pay more attention to the cleaning of mouths, but according to our preconceived ideas this constitutes extraction in preparation for dentures in most cases.

My experience has led me to adopt certain principles which I believe are in accordance with the views of the authorities and which may be of interest.

(1) *Scalings.* Every scaling is necessary. The reason is not so much a surgical as a military one. The soldier is taught habits of cleanliness, and the cleaning of his teeth is one of the most important. He cannot keep his teeth clean if they require scaling, and there-

fore, apart from the surgical aspect, scaling is a necessity. There is reason to believe that scaling is appreciated by the majority, and it is the foundation of regular habits of cleanliness.

(2) *Fillings.* It soon becomes clear in treating soldiers that to fill every savable tooth is unnecessary, even if it were possible. When, however, the soldier has lost so many teeth that further extraction would render dentures necessary, any cavities that exist must be filled.

Sometimes it is possible to select one side of a man's mouth for filling, and give the soldier a comfortable masticating surface; the other side can then be entirely neglected. It is very important to fill teeth supporting dentures. I have been impressed by the large number of teeth in which the caries has become naturally arrested, and advantage of this tendency can often be taken.

(3) *Extraction.* In examining, it becomes apparent that there are large numbers of useless stumps whose removal would still leave efficient mastication. A feeling of dissatisfaction is created in the mind of the soldier by the extraction of such stumps, because he thinks he is entitled to have them replaced. It should always be explained, therefore, that substitutes will not be allowed, and the soldier will usually prefer to leave the stumps until they give him trouble. In cases, however, where there are symptoms of general ill health probably caused by oral sepsis, such extraction has to be insisted upon.

Extraction in preparation for dentures forms the greater part of our operative work, and is by far the most important part of our work. It is to be regretted that in so large a proportion of cases the teeth are beyond saving. Such, however, is the case, and we are faced with the problem as to whether the teeth must be extracted and dentures provided, or the soldier allowed to continue using his stumps for mastication. It is impossible to lay down a sweeping rule, and each case has to be judged on its merits.

The following points concerning dentures have to be considered. I am aware that they are not in accordance with text-book teaching, but from a military point of view I am convinced of their soundness:

(*a*) As a mechanical contrivance dentures are inferior to stumps, provided the stumps are not tender.

(*b*) From a surgical point of view dentures are a greater abomination than stumps, under active service conditions, unless there is some incentive for the soldier to keep his dentures clean. It must be borne in mind that the soldier under fire lives in a state of tension, and his daily habit of cleaning his teeth tends to be neglected. Even officers neglect their teeth-cleaning, sometimes because clean water is scarce, but generally because they forget.

If we could follow the men for whom we have provided dentures out to the front a fortnight later, and could examine their dentures, in a large percentage of cases we should find the dentures in a far more septic condition than the original stumps. Even in the training camps at home, my experience shows that the men with dirty tongues and offensive breath are the men who wear dentures, while the men with stumps have clean tongues and breath. The soldiers who take care of their dentures at the front are invariably those who have reason to be grateful for the provision on account of improved health and greater comfort.

(*c*) Dentures are liable to be broken or lost, the gums may shrink and the dentures become loose, and the loss of a tooth supporting a denture may render the denture useless. In any of these circumstances, a visit to a base at the public expense is necessary, besides the loss of a fighting unit for a week or two.

The vast majority of men whose teeth are mostly stumps are enjoying good health. A parade of a large number of such men leaves no doubt. In civil life under the social conditions that existed before the war, their daily occupations tended to lower their resistance. When they enter the army their habits of life become regular; in most cases they are better clothed and fed than ever before, and they are put through a graduated course of training and exercise especially designed to make them fit. Surely, if they enjoyed good health before, they will do so now. Their dental condition was neglected before, and now if the mouths are scaled and cleaned, the habit of the toothbrush acquired, and essential teeth carefully filled, nothing more is needed to insure continued health in the vast majority of cases.

There remains, however, a proportion of cases whose dental condition is responsible for ill health in one form or another. Such men are classed as category "A," which does not mean they are physically fit for the front at the time of enlistment, but that they are likely to become fit as a result of the training. Some of them become fit in spite of their dental condition, but for most of them dental treatment is absolutely necessary.

It is therefore essential that the dental surgeon should see the men when they are first drafted to the training center, so that, in consultation with the medical officer, the history of each case can be gone through where the teeth are mostly stumps, and it can be decided as to what extent the condition has affected the general health, whether the training is likely to eliminate the symptoms, or whether extraction in preparation for dentures would not only be genuinely appreciated by the soldier himself, but would be the determining factor as to whether or not he would ultimately become fit for the front.

Extraction vs. Preservation of Teeth in the English Army.

[THE following letter to the editor of the *British Dental Journal* is reprinted from the Correspondence department of that journal.—ED.]

Sir,—As a dental surgeon, with two years' experience of work among the troops near the front, I was delighted to read Captain Finn's paper in your issue of January 15th. His remarks on the provision of dentures express my views exactly. There is far too much eagerness to "clear out" roots and decayed teeth, thereby putting the man *hors de combat* for a considerable time. A large portion of these men subsequently fitted with dentures eventually carry the latter in their pockets or haversacks, where they get broken or lost, or break them on the first biscuit they attempt to eat. My plan has always been to preserve every scrap of tooth substance possible. Many a mouth, which at first view looks quite hopeless, when cleaned and the soft and decayed dentin cleared away, if the remaining cavities and roots are rapidly filled or capped with cement, after sterilization, can be rendered quite serviceable, and the man can "carry on" in comfort for several months. Half a dozen roots when opposed by teeth in the opposite jaw are of far more value out here than when replaced by the most perfectly fitting denture. In my opinion, it is waste of time and material to fit up middle-aged men with dentures who have not previously worn them, and who are proceeding to the front.

C. L. MACKANESS, *Capt. Dent. Surgeon, Att. R. A. M. C.*

Army Dental Corps: Information as to Examinations.

TWO HUNDRED AND FIFTY VACANCIES TO BE FILLED.

(1) THE Surgeon-general of the Army announces that there are, at the present time, approximately 250 vacancies in the Dental Corps, and that examination for the appointment of dental surgeons will be held at various points in the United States, on Monday, March 11, 1918.

(2) Application blanks and full information concerning these examinations can be procured by addressing "Surgeon-general, U. S. Army, Washington, D. C."

(3) The Dental Corps is a constituent part of the Medical Corps of the army, and consists of officers in the grades of colonels, lieutenant-colonels, majors, captains, and first lieutenants. Appointments therein are made at the rate of 1 for each 1000 of the total strength of the regular army authorized from time to time by law. The law requires that first lieutenants of the Dental Corps shall serve five years in that grade before being promoted, but for the period of the existing emergency this provision has been suspended by act of Congress, and after one year's service as first lieutenant, a dental surgeon is eligible for promotion to the grade of captain, after which promotions are made in order of seniority as vacancies occur in the higher grades.

(4) No applicant may under the existing law be commissioned in the Dental Corps unless he is between twenty-one and thirty-two years of age, a citizen of the United States, a graduate of a standard dental college, and of good moral character, nor unless he shall pass the usual physical examination required for appointment in the Medical Corps, and a professional examination which shall include tests of skill in practical dentistry and of proficiency in the usual subjects of a standard dental college course. Whether or not the applicant is married has no effect upon his eligibility for the Dental Corps.

(5) Application for appointment must be

made in writing to the Surgeon-general of the Army, upon the prescribed blank form. All the interrogatories on the blank must be fully answered. In compliance with the instructions thereon, the application must be accompanied by testimonials, based upon personal acquaintance, from at least two reputable persons, as to the applicant's citizenship, character, and habits.

The selection of the candidates is made by the Surgeon-general from the applications submitted, and a formal invitation to report for examination to the most convenient examining board in each case will be issued by him.

(6) The examinations are conducted under instructions from the Surgeon-general, and usually last six days. No allowance can be made for the expenses of applicants undergoing examination, whether incurred in travel to and from or during their stay at the place of examination, as public funds are not available for the payment of such expenses.

Each applicant, upon presenting himself to the board, will, prior, to his physical examination, be required to submit his diploma as a graduate of a standard dental college. Should he fail to do so the examination will not proceed.

(7) A first lieutenant receives $2000 per annum, a captain $2400 per annum, a major $3000 per annum. These salaries are increased by 10 per cent. for each period of five years until the maximum of 40 per cent. is reached, excepting that the maximum salary of a major is $4000 a year, and that of a lieutenant-colonel and colonel is $375 and $416.66 per month respectively. In addition to their pay proper, they are furnished with a liberal allowance of quarters according to rank, either in kind, or where no suitable Government building is available, by commutation. Fuel and light therefor are also provided. When traveling on duty an officer receives mileage for the distance traveled. On change of station he is entitled to transportation of professional books and papers, and a reasonable amount of baggage at Government expense. Groceries and other articles for their own use may be purchased from the quartermaster at about wholesale cost prices. Dental surgeons are entitled to medical attendance and hospital treatment without charge other than for subsistence.

(8) Officers of the Dental Corps are entitled to the privilege of retirement after forty years' service, or at any time for disability incurred in the line of duty. On attaining the age of sixty-four, they are placed on the retired list by operation of law. Retired officers receive three-fourths of the pay of their rank (salary and increase) at the time of retirement.

(9) In order to perfect all necessary arrangements for the examination, applications must be in the possession of the Surgeon-general at least two weeks before the date of examination. Early attention is therefore enjoined upon intending applicants.

Five of the candidates who took the examination for commission in the regular dental corps of the army have been reported as qualified. This represents those candidates who could not be appointed because of the age limit if there were any further delay, so they are being commissioned in advance of the others who were examined at the same time, and upon whose qualifications a report will be made later. These officers have been nominated as first lieutenants of the army dental corps, and were confirmed just before the adjournment of the Senate for the holiday recess. Those who are to be commissioned on account of the possibility of age disqualification are Lieuts. John L. Richards, Winfred E. Henshaw, Joseph E. Schaefer, George J. Sibley, and Frank P. K. Barker.

The legislation of October 6th provides that the dental corps shall be on the same basis as the regular medical corps. Under an opinion rendered by the Judge Advocate-general of the Army, it will be necessary to have examinations for promotion. During the present emergency dental surgeons of the rank of first lieutenant who have served one year in that grade will be examined with a view to advancement to the grade of captain. Promotions to grades senior to that of captain will be made to fill vacancies existing. This means, in the increased corps by virtue of legislation of October 6th, 12 colonels, 20 lieutenant-colonels, and 87 majors. If the present emergency terminates, of course, the first lieutenants of the dental corps will have to serve five years in that grade before promotion. The provision in the law of October 6th for recommissioning of officers of the dental corps provides that they shall be commissioned as first lieutenants, captains, etc., instead of as dental surgeons with the rank of first lieutenant, etc.—*Army and Navy Register.*

One of the branches of the army in which there has been a marked increase—something over 1744 per cent.—is that of the dental personnel. When this country entered the war, the army had only 86 dental officers who were members of the dental corps, and of whom 19 were captains and the remainder first lieutenants, and it was necessary to provide an almost entirely new dental personnel to take care of the greatly expanded military establishment. Up to December 15th, 1500 dental officers actually were on duty, of whom 178 belong to the dental corps of the regular army, 227 to the dental corps of the National Guard, and the remainder to the dental reserve corps, this being the number required for an army of 1,500,000 men on the basis of one dental officer to every 1000 men as prescribed for the regular army. Moreover, enough additional dentists have been commissioned in the dental reserve corps, but not placed on active duty, to provide, with those already on duty, a dental personnel for 5,000-000. Owing to enrollment of dentists in sufficient numbers to take care of all anticipated needs, the issue of further commissions was suspended on September 18th, except where men of well-known attainments were required for special duties, and enrollment of the latter class was suspended on December 15th. In carrying on the general dental work of the army, dental surgeons are organized into units, for each of which a dental infirmary is provided. While not permanently assigned to any definite organization, a dental unit ordinarily serves a brigade, with such additional organizations as may be conveniently assigned. Each unit operates under an assistant dental surgeon, selected by the chief dental surgeon of the camp. All dental officers are under the immediate control of the dental surgeon, who in turn is under supervision of the division surgeon. Ordinarily one assistant dental surgeon and ten operating dental surgeons are assigned to each dental unit. The dental division of the office of the Surgeon general of the Army is in charge of Major William H. G. Logan, medical reserve corps, of Chicago, one of the foremost dental surgeons of the country. He is president of the National Dental Association and chairman of the dental committee of the general medical board of the Council of National Defense. Captains Julien R. Bernheim and John R. Ames, dental corps, are on duty as his assistants.—*Army and Navy Register.*

The authorized strength of the regular army now being 380,000, the commissioned personnel of the army dental corps will hereafter be 380.

The decision to have first lieutenants serve one year before they are eligible to promotion will retard some of the advancements from that grade. A number of first lieutenants will become lieutenant-colonels as a result of the increase in the corps authorized by the act of October 6th. The one-year service begins with the date of acceptance of commission.

Arrangements are being made for the examination of officers of the dental corps, with a view to their promotion. The first board will be of special composition and consist of a medical officer and two dental surgeons to convene in Washington for the examination of Captains J. R. Bernheim and John R. Ames, who are on duty in the Surgeon-general's office. Upon the qualification of those officers the examining board will be dissolved and a new board convened, consisting of a medical officer and Captains Bernheim and Ames, the former being a colonel and the latter a lieutenant-colonel as a result of the promotions in the corps. Similar boards will be convened at St. Louis, San Francisco, and San Antonio. —*Army and Navy Register.*

Dental Personnel Promotions.

Recommendations have gone from the Surgeon-general of the Army to the chief of staff in regard to advancement of members of the dental corps of the regular army, in accordance with the act of October 6, 1917. This act provides that the dental corps shall consist of commissioned officers of the same grade and proportionately distributed among such grades as are now or may be hereafter provided by law for the medical corps, who shall have the rank, pay, promotion, and allowances of officers of corresponding grades in the medical corps, including right to retirement as in the case of other officers. The act provides also that there shall be one dental officer for every thousand of the total strength of the regular army authorized from time to time by law. Prior to this act, dental officers above the rank of captain were not authorized. In accordance with the recommendations of the Surgeon general, of the 178 members of the dental corps, 12 will be promoted by seniority to colonel, 20 to lieutenant-colonel, and 87 to major, leaving the remainder in the grade of first lieutenant for the time being. These advancements will take up at least to the grade of major all that were members of the dental corps at commencement of the war, and some that have entered since that time. The

Surgeon-general's office also is making arrangements to recommend a corresponding reorganization in the dental reserve corps, and to give increased rank to selected officers whose attainments and records warrant recognition.—*Army and Navy Register.*

Dental Corps Promotions.

ORDERS are being prepared directing the convening of boards for examination of members of the regular dental corps due for promotion in accordance with the act of October 6, 1917, which gives that corps the same grades as the medical corps, with distribution in the grades in the same promotion as in the medical corps. This gives the dental corps 12 colonels, 20 lieutenant-colonels, and 87 majors. It will result in the advancement to colonel of captains down to and including Julien R. Bernheim, to lieutenant-colonel of captains, and first lieutenants down to and including First Lieut. Charles deW. Deyton, and to major of the remaining first lieutenants who had at least a year's service on October 6th. Under the requirement of a year's service before a dental officer shall be eligible to advancement, some 54 first lieutenants, down to and including Howard I. Benedict, will become majors, leaving 26 vacancies to the grade to be filled, as officers complete a year's service from time to time. Thereafter, in the same manner, the grade of captain will be filled.—*Army and Navy Register.*

New Army Dental Surgeons.

THE following-named applicants for appointment in the Dental Corps of the Army, having passed the required examination, their commissions as first lieutenants in that corps in the following order are recommended.

John Godfrey Urban, 1st lieut., D. R. C.: Schofield Barracks, H. T., Hawaiian Islands.

Carl Stevenson Emmert, 1004 Hume Mansur, Indianapolis, Ind.

William Henry Siefert, 1st lieut., D. R. C.: Fort Omaha, Neb.

Samuel J. Lewis, Kalamazoo, Mich.

James Henry O'Reilly, 1st lieut., D. R. C.: Fort Sam Houston, Texas.

Frederick Werner Miller, Kansas City, Mo.

James Alfred Curtis, Jr., Atlanta, Ga.

James Jay Weeks, 1st lieut., D. R. C.: Camp Cody, Deming New Mexico.

John Nelson White, Green, Ky.

Homer Lash Sams, 1st lieut., D. R. C.: Presidio of San Francisco, Cal.

George Magner Krough, 1st lieut., D. C. of N. G., Camp Cody, Deming, N. Mex.

Wayne W. Woolley, 1st lieut., D. R. C., Camp Cody, Deming, N. Mex.

Edward Wallace Barr, 1st lieut., D. R. C., 6th F. A., 1st Div., A. E. F.

Fernando Emilio Rodriguez, 1st lieut., D. R. C.: Camp Upton, N. Y.

John Leigh Davis, 1st lieut., D. R. C., Camp Upton, N. Y.

Joseph Henry Jaffer, 1st lieut., D. R. C., Camp Green, Charlotte, N. C.

Adolph August Meyer, Stockton, Cal.

Howard Clayton Feyler, 1st. lieut., D. R. C., Columbus Barracks, Ohio.

William Ferdinand Scheumann, Fort Wayne, Ind.

Alonzo Gooch McCue, Jr., 1st lieut., D. R. C., Headquarters, 28th Inf., 1st Div., A. E. F.

Campbell Hopson Glascock, St. Louis, Mo.

Austin Freeman Roberts, 1st lieut., D. R. C., Fort McDowell, Angel Island, Cal.

William Frederick Wieck, Angleton, Texas.

Thomas Herbert Veale, Quincy, Mass.

Lawrence Joseph Dunn, 1st lieut., D. R. C., New York City.

Carl Reuben Oman, Seattle, Wash.

Leslie Albert Gould, 1st lieut., D. R. C., Camp Upton, N. Y.

Harold Avery Curtis, Waverly, N. Y.

The Navy Dental Corps.

APPOINTMENTS have been made to the navy dental corps during the past few weeks, but no more applications will be received by the Surgeon-general of the Navy for some time; since the corps is now in possession of a considerable number of dental surgeons who will be on the inactive list subject to call for service when needed.—*Army and Navy Register.*

Dental Surgeons Society of Camp Dodge.

AT a meeting of the dental surgeons located at Camp Dodge, Iowa, on November 12, 1917, the following officers were elected: Capt. Frank P. Stone, D.C., honorary president; Lieut. Donald B. Cornell, D.R.C., president; Lieut. Thomas L. Rice, D.R.C., vice-president; Lieut. Stanton L. Sherman, D.R.C., secretary; Lieut. Gerrit H. Hospers, D.R.C., treasurer.

Renewal of Dental Prostheses

For French Soldiers.

M. Justin Godart, French under-secretary of state for the military medical department, has issued an order by which all aids to mastication (plates, bridges, etc.), furnished to soldiers of all classes to relieve them of digestive disturbances, or which they will use during their enlistment in the army or auxiliary service, will be so furnished only during the period of enlistment; but soldiers who have sustained injuries of the jaws or teeth while in service shall be considered as *mutiles de guerre* (war-mutilated), and will have the right to renew their prosthesis during their lifetime.—*Journ. Amer. Med. Association.*

Assignments.

Army Dental Corps.

Week ending December 22d.

1st Lieut. Walter D. Vail to St. Louis School of Plastic and Oral Surgery, Washington University, for instruction and return to station.

Week ending December 29th.

1st Lieut. Charles L. Andrews from duty at Camp Funston to Austin, Tex., School of Military Aeronautics, for duty.

Week ending January 12th.

John L. Richards, of Minnesota, and 1st Lieuts. Winfred E. Henshaw, Joseph E. Schaefer, George J. Sibley, and Frank P. K. Barker, to dental reserve corps.

Army Dental Reserve Corps.

Week ending December 22d.

1st Lieut. Daniel S. Lockwood to Camp Meade, Md., for duty.

1st Lieut. William H. Delbridge, Jr., to Deming, N. M., Camp Cody, for duty.

1st Lieut. Harold J. McGinn to Garden City, N. Y., concentration camp and supply depot for duty.

1st Lieut. William M. Kester to Wrightstown, N. J., Camp Dix, for duty.

The following to St. Louis, School of Plastic and Oral Surgery, Washington University, for instruction: 1st Lieuts. Ernest E. Buell, Clarence S. DeLong, Edward F. Lefitte, Edward B. Lodge, Walter Sorenson, Pearly M. Fugler, John A. Robinson, and Charles F. Pickering.

Week ending January 12th.

1st Lieut. Harold S. Embree to Camp Cody, N. M., 34th division, for duty.

Stenographers and Typists Wanted—Men and Women.

The United States Government is in urgent need of thousands of typewriter operators and stenographers and typists. All who pass examinations for the departments and offices at Washington, D. C., are assured of certification for appointment. It is the manifest duty of citizens with this special knowledge to use it at this time where it will be of most value to the Government. Women especially are urged to undertake this office work. Those who have not the required training are encouraged to undergo instruction at once.

Examinations for the Departmental Service, for both men and women, are held every Tuesday in 450 of the principal cities of the United States, and applications may be filed with the Commission at Washington, D. C., at any time.

The entrance salary ranges from $1000 to $1200 a year. Advancement of capable employees to higher salaries is reasonably rapid.

Applicants must have reached their eighteenth birthday on the date of the examination.

For full information in regard to the scope and character of the examination and for application blanks address the U. S. Civil Service Commission, Washington, D. C.; or the Secretary of the U. S. Civil Service Board of Examiners at Boston, Mass.; New York, N. Y.; Philadelphia, Pa.; Atlanta, Ga.; Cincinnati, Ohio.; Chicago, Ill.; St. Paul, Minn.; St. Louis, Mo.; New Orleans, La.; Seattle, Wash.; San Francisco, Cal.; Honolulu, Hawaii; or San Juan, Porto Rico.

John A. McIlhenny,
President U. S. Civil Service Commission,
Washington, D. C.

SPECIAL NOTICE.

Preparedness League of American Dentists.

(Organized under the auspices of the N. D. A.)

Headquarters—3 Professional Building, 131 Allen St., Buffalo, N. Y.

COMMITTEE ON ORGANIZATION.

J. W. Beach, Buffalo, *Chairman.*
H. A. Pullen, Buffalo, *Vice-chairman.*
M. B. Eshleman, Buffalo, *Sec'y-Treasurer.*

ADVISORY COMMITTEE.

J. W. Beach, N. Y.	F. M. Casto, Ohio.	J. D. Millikin, Calif.
H. J. Burkhart, N. Y.	T. P. Hinman, Georgia.	A. W. Viney, Calif.
M. B. Eshleman, N. Y.	O. U. King, Indiana.	C. J. Lyons, Mich.
F. W. Low, N. Y.	T. W. Brophy, Illinois.	H. E. Friesell, Pa.
H. A. Pullen, N. Y.	W. H. Logan, Illinois.	E. C. Kirk, Pa.
H. L. Wheeler, N. Y.	G. N. West, Illinois.	J. V. Conzett, Iowa.
L. L. Barber, Ohio.	T. B. Hartzell, Minn.	B. H. Smith, Md.
S. D. Boak, Ohio.	F. W. Hergert, Wash.	F. T. Murlless, Conn.
H. C. Brown, Ohio.	F. O. Hetrick, Kansas.	M. F. Finley, D. C.

To Every American Dentist.

By J. W. Beach, *Chairman*, Buffalo, N. Y.

President Wilson has asked that every resource for winning the war be utilized to the very limit. The dental profession forms one of the greatest resources for making our army efficient. You are an integral part of this great source of help to your country. Will you meet this responsibility as an American citizen should? Of course you will.

How Can It Best be Done?

By joining the Preparedness League of American Dentists *now*, and assisting in its great work. Ten thousand new members are needed right away. If you are already a member, we ask you to get five more just as soon as possible. The mouths of the men in our new national army must be made healthy and dentally fit before they go to cantonments, and we must help to the limit of our ability.

The Preparedness League of American Dentists is a recognized agency for carrying on this work under the direction of the Surgeon-general's office of the War department, the National Dental Association, and the Committee on Dentistry, Subcommittee of the Council of National Defense.

There are forty-five thousand dentists in the United States. Six thousand belong to the League, and have done the major part of the following work: July 16 to November 3, 1917: Fillings 60,946; extractions 35,909; cleanings 2,233; crowns 133; bridges 184; plates 165; unclassified operations 6,891—total 111,061. Thousands of operations not listed were performed prior to and since these dates.

If every one of the 45,000 had done his part, what a splendid showing we could have made! It is not too late to become a part of this great work for increasing the fighting power of our army. We know you are with us.

Don't let the Germans show all the efficiency! Let's show what we can do!

We've got to work together to win this war. Do your part by joining the League *today*, and we will give you real, properly directed work to do.

For membership send one dollar ($1.00), payable but once, to the Preparedness League of American Dentists, 131 Allen st., Buffalo, N. Y. (Kindly inclose business card to avoid mistakes in name and address.)

SOCIETY NOTES AND ANNOUNCEMENTS

NOTICES should reach the Office of the DENTAL COSMOS not later than the 11th or 12th of the month preceding that of publication.

Psi Omega Fraternity.

ANNUAL BANQUET.

THE twenty-sixth annual banquet of the Psi Omega Fraternity will be held at the Hotel Astor, Broadway and Forty-fourth st., New York, N. Y., Saturday, February 16, 1918, at 7.30 P.M.

All members of Psi Omega are cordially invited to attend.

JOHN L. PETERS, *Treasurer*,
133 West 72d st., N. Y. City.

Marquette Dental Alumni Association.

THE Marquette University Dental Alumni Association will hold the annual clinic in the auditorium, Milwaukee, Wis., February 13, 14, and 15, 1918. A fine program is being arranged.

V. A. SMITH, *Sec'y*,
Milwaukee, Wis.

Vermont State Dental Society.

THE forty-second annual meeting of the Vermont State Dental Society will be held at the New Sherwood Hotel, Burlington, Vt., on March 20, 21, and 22, 1918.

PHILIP E. MELLEN, *Sec'y*.
Middlebury, Vt.

Virginia State Dental Association.

THE Virginia State Dental Association will meet in Roanoke, Va., April 25, 26, and 27, 1918.

F. R. TALLEY, *Corr. Sec'y*,
Petersburg, Va

University of Iowa, College of Dentistry.

THE dedication of the new dental building of the College of Dentistry, State University of Iowa, will be held February 22d; the Alumni and College of Dentistry Clinic, February 23, 1918, in Iowa City, Iowa.

R. R. DEKRUIF, *Sec'y*.
Des Moines, Ia.

Minnesota State Dental Association.

THE thirty-fifth annual convention of the Minnesota State Dental Association will be held February 7, 8, and 9, 1918, at the University of Minnesota, Minneapolis, Minn.

All members of the National Dental Association are invited. For information, write

MAX E. ERNST, *Sec'y*,
1125 Lowry Bldg., St. Paul, Minn.

Connecticut State Dental Association.

THE fifty-fourth annual meeting of the Connecticut State Dental Association will be held at the Hotel Taft, New Haven, Conn., April 18, 19, and 20, 1918.

GEO. S. B. LEONARD, *Sec'y*.

Texas State Dental Society.

THE thirty-eighth annual convention of the Texas State Dental Society will be held at San Antonio, Texas, the famous City of the Alamo, April 10, 11, and 12, 1918. Members of other state societies are cordially invited to attend.

J. G. FIFE, *Sec'y*,
736 Wilson Bldg., Dallas, Texas.

Pennsylvania State Dental Society.

The golden anniversary meeting of the Pennsylvania State Dental Society will be held in Wilkes-Barre, April 23, 24, 25, and 26, 1918. Excellent talent has been secured for the occasion and the program extended to a four days' session. To judge by preliminary reports of committees, this event promises to be the greatest meeting in the history of this organization. All ethical practitioners are cordially invited to attend.

J. F. Biddle, *Sec'y*,
517 Arch st., Pittsburgh, Pa.

Kansas State Dental Association.

The annual meeting of the Kansas State Dental Association will be at Topeka, Kans., on April 15, 16, and 17, 1918.

C. K. Weaver, *Sec'y*,
Clay Center, Kans.

Odontological Society of Western Pennsylvania.

The thirty-seventh annual meeting of the Odontological Society of Western Pennsylvania will be held in the Hotel Chatham, Penn ave. and Fourth st., Pittsburgh, Pa., Tuesday and Wednesday, April 9 and 10, 1918.

The Program Committee promises one of the best dental meetings ever held. Men of note will read papers of interest to the twentieth-century dentist.

The clinics will be given by the study clubs of Western Pennsylvania, and will be of interest to one and all.

Exhibitors will be amply accommodated with space by addressing Dr. Leslie Waddill, Jenkins Arcade Bldg., Pittsburgh, Pa.

King S. Perry, *Sec'y*,
719 Jenkins Bldg., Pittsburgh, Pa.

Illinois State Dental Society.

The fifty-fourth annual meeting of the Illinois State Dental Society will be held at Bloomington, Ill., May 14, 15, 16, and 17, 1918.

J. E. Hinkins, *President*,
Chicago, Ill.
J. P. Luthringer, *Sec'y*,
Peoria, Ill.

North Carolina Dental Society.

The North Carolina Dental Society will meet on June 19 to 21, 1918. Headquarters, Oceanic Hotel, Wilmington, N. C.

W. T. Martin, *Sec'y*.

Kentucky State Dental Association.

The next annual meeting of the Kentucky State Dental Association will be held at Lexington, Ky., June 13, 14, and 15, 1918. An "amalgam program" of special interest.

Address all correspondence to

W. M. Randall, *Sec'y*,
1035 Second st., Louisville, Ky.

Maine Board of Examiners.

The Maine Board of Dental Examiners will hold a special examination, beginning February 19, 1918, at 8.30 a.m., at the State-house.

All applications and fee of $20 must be in the hands of the secretary by February 9, 1918.

Will S. Payson, *Sec'y*,
Castine, Me.

Massachusetts Board of Examiners.

A meeting of the Massachusetts Board of Dental Examiners will be held in Boston, Mass., February 11 to 15, inclusive, 1918, for the examination of candidates for registration. All applications must be in the hands of the secretary on or before February 2d. For further information address

George H. Payne, *Sec'y*,
29 Commonwealth ave., Boston, Mass.

Mississippi Board of Examiners.

The Mississippi Board of Dental Examiners will hold its next annual meeting at the State Capitol building in Jackson, on the third Tuesday in June 1918, at 8 a.m. Fee for examination $10. Practical and written examinations. Diploma from recognized school and certificate of moral character required. No reciprocity or interchange. For further information, address

B. J. Marshall, *Sec'y*,
Marks, Miss.

Forsyth Dental Infirmary for Children.

NEW DEPARTMENT—LIBRARY AND MUSEUM.

THE trustees and director of the Forsyth Dental Infirmary for Children have authorized the creation of a new department, to be known as the "Library and Museum." They solicit from the dental profession contributions of books and dental periodicals, particularly those out of print and not readily obtainable by purchase; also specimens of dental abnormalities, casts, or specimens of unusual structures of dental interest. for all of which permanent acknowledgment will be given.

FREDERICK A. KEYES. D.M.D.,
Librarian and Curator of Museum.

National Mouth Hygiene Association.

DEPARTMENT OF EXTENSION LECTURES.

A COMPLETE lecture set, consisting of full manuscript and thirty-six specially selected and prepared lantern slides covering the subject of Mouth Hygiene, is furnished by this association to members of state dental societies and others who may be considered as qualified to present the subject on the lecture platform.

For rental and sale terms and other particulars address the undersigned.

EDWIN N. KENT,
Director of Extension Lectures,
330 Dartmouth st., Boston, Mass.

UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING DECEMBER 1917.

December 4.

No. 1,248,477, to ELIAS T. GOLDBERG. Artificial tooth.

No. 1,248,675, to MAX KOWENSKY. Toothbrush.

No. 1,248,690, to FOSTER B. MACDONALD. Attachment for dental impression tray.

No. 1,248,778, to GEORGE B. ALLEN. Rotatable brush.

December 11.

No. 1,248,891, to ROBERT O. BRITTAIN. Artificial tooth.

December 18.

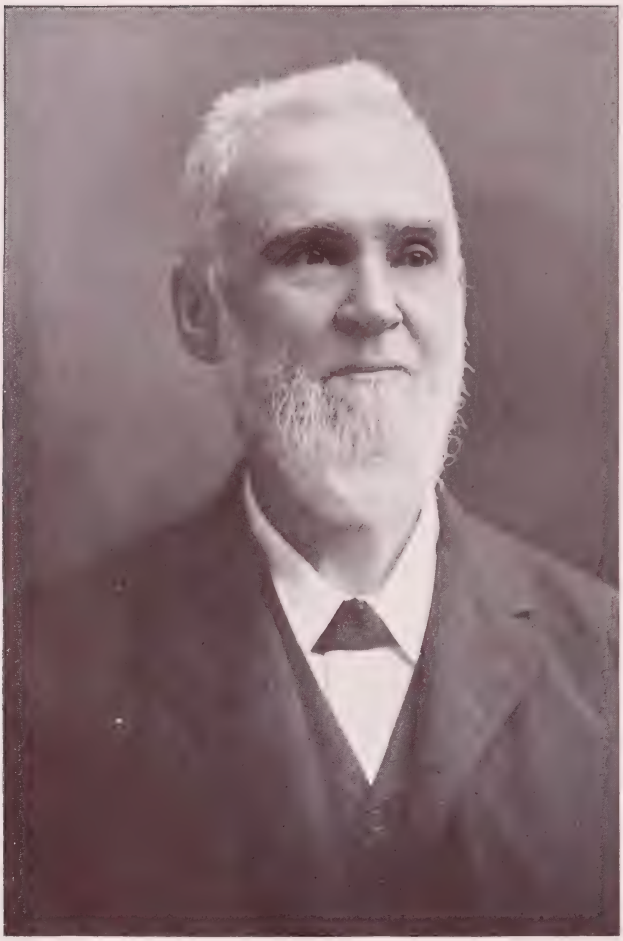
No. 1,250,454, to THOMAS M. HEARD. Toothbrush.

December 25.

No. 1,250,953, to CLARENCE B. BOWLING AND LEROY B. BENNETT. Dental floss holder.

No. 1,250,956, to COURTLAND G. CAPWELL. Dental obtunding syringe.

No. 1,251,250, to ARTHUR A. LIBBY. Toothbrush.



DR. JAMES BEALL MORRISON.

THE

DENTAL COSMOS

VOL. LX. MARCH 1918. No. 3

ORIGINAL COMMUNICATIONS

The Relationship of Oral Secretions to Dental Caries.

II. Conditions Influencing the Quantity and Action of the Amylase Content of Human Saliva.

By HERMANN PRINZ, D.D.S., M.D., Philadelphia, Pa.

From the Laboratory of Pharmacology, Evans Institute, Univ. Pennsylvania.

(Continued from page 147.)

NUMEROUS attempts have been made in the past to discover some tangible method for the purpose of determining the influence of extraneous causes, such as psychic influences, nervous irritants, and especially foodstuffs, on the amylase content of saliva. Without entering into a detailed discussion of the literature on the subject, let it suffice to say that the more recent investigators (and their many co-workers) may be enumerated as follows: A. L. Chittenden, J. P. Pawlow, J. N. Langley, C. L. Evans, L. Michaelis, J. Wohlgemuth, H. P. Pickerill, and others too numerous to mention. By a careful perusal of the enormous mass of literature of the last fifty years, one is primarily impressed with one singular fact, *i.e.* that a number of investigators have approached the subject from a teleologic point of view, and hence have failed to solve the problem. For instance, if we merely feed an experimental subject (and parenthetically it should be emphasized that the subject for the purpose under consideration must be a human being and not an animal, since results drawn from such comparative experiments for numerous reasons are frequently misleading) and examine the amylase content of the saliva during and for some time after the various test meals, only comparative results are obtained which do not portray the actual working conditions of this amylase content.

The fundamental question which *a pri-*

TABLE 1.—AVERAGE AMYLOLYTIC INDICES IN 29 PATIENTS SELECTED AT RANDOM.

Case No.	Sex.	Color.	Age.	No. of cavities in teeth.	No. of fillings in teeth.	No. of missing teeth.	No. of artificial teeth.	Care of teeth.	General health.	Hours after latest meal (lunch, breakfast, or dinner).	Amylolytic index.
1	*m*	w	*23*	10	10	0	0	Good	Good	1½ (l.)	120
2	*m*	"	*20*	11	11	2	1	"	"	1½ "	50
3	*m*	"	*19*	8	8	0	0	"	"	1½ "	60
5	*m*	"	*24*	18	16	1	0	"	"	1½ "	100
4	*f*	"	*31*	12	8	9	3	Fair	"	4 (br.)	80
6	*m*	"	*21*	13	12	1	0	Good	"	1½ (l.)	275
7	. .	(Same patient as No. 2, one week later.)					. .	"	"	1 "	80
8	*m*	w	*21*	15	15	1	1	"	"	6 (br.)	120
9	*m*	"	*19*	17	15	0	0	"	"	2½ "	100
10	*m*	"	*23*	10	10	0	0	"	"	2½ "	160
11	*m*	"	*34*	7	5	3	0	Poor	Fair	2½ (l.)	120
12	*f*	c	*29*	2	0	5	0	Fair	Good	5 (br.)	260
13	*m*	w	*37*	1	1	12	15	Good	"	1½ (l.)	70
14	*m*	"	*20*	12	11	4	0	"	"	1 "	100
15	*m*	"	*16*	1	0	17	0	Poor	Fair	1½ "	250
16	*m*	"	*52*	4	1	2	0	"	Poor	18 (d.)	160
17	*m*	c	*54*	4	0	25	14	"	Good	7 (br.)	180
18	*f*	w	*46*	7	4	18	6	"	Fair	2 (l.)	312
19	*m*	"	*36*	4	0	21	0	"	"	6 (br.)	190
20	*f*	c	*37*	5	0	19	0	"	Poor	16 (d.)	200
21	*m*	w	*18*	10	6	0	0	Fair	Good	7 (br.)	180
22	*m*	"	*45*	1	0	31	0	Poor	Fair	2 (l.)	140
23	*m*	"	*24*	11	11	0	0	Good	Good	2½ "	160
24	*m*	"	*23*	12	9	0	0	"	"	4 "	180
25	*m*	"	*24*	19	13	6	0	"	Fair	1½ "	200
26	*f*	"	*22*	8	8	1	0	"	Good	2 (br.)	312
27	*f*	"	*50*	0	0	32	0	. .	Fair	2½ "	140
28	*f*	"	*45*	0	0	32	28	. .	Good	3 "	50
29	*m*	"	*64*	0	0	32	28	. .	. .	2½ "	80
30	*m*	"	*63*	0	0	32	28	. .	. .	3 "	160
31	. .	(Same patient as No. 26, three days later.)					. .	. .	. .	3 (l.)	80
32	. .	(" " " No. 28, five " ")					. .	. .	. .	3 "	80

ori confronts the investigator may be formulated as follows: What working conditions influence the quantity and the action of the amylase content of human saliva? Within limitations, the amylolytic index of human saliva is constantly changing during the various periods of the day. The flow of saliva is solely dependent upon nervous impulses. These impulses are primarily of a mechanical or chemical nature, although psychic impulses, *i.e.* fear or the sight of tempting food, have also to be reckoned with; and again, the action of specific drugs, *e.g.* atropin, pilocarpin, nicotin, markedly affect the salivary secretion. These latter conditions, however, do not play any part in our present consideration. The quantity and to a large extent the quality of secreted saliva are, within certain limits, directly proportional to the intensity of the irritant, primarily foodstuffs, and the mechanism of the masticatory process. Regarding the nervous impulses which control the flow of saliva (or any other glandular secretion) physiologists as yet have not definitely settled which of the two leading theories, that of Heidenhain or that of Langley and Carlson, is the correct one. Heidenhain maintains that with the increase of the ratio of flow the content of salts in the saliva is also increased, the greater the quantity of the secretion the higher being the amount of inorganic constituents. Langley and Carlson, on the other hand, claim that the secretory function of the gland is dependent upon the specific nature of the blood pressure. Accepting the correctness of these two theories for the present, we may assume that any substance entering the oral cavity irritates the endings of centripetal nerves which control the secretion of saliva. Depending upon the quality of the irritant the resultant impulse is conducted to the various parts of the glandular tissue, and thereby causes a flow of saliva of a specific composition. However, it has been demonstrated by Pawlow that if a dog with a gastric fistula is fed a carbohydrate "sham meal," in which food is chewed but not swallowed, no change in the amylase content of the saliva is observed while, on the other hand, if the same meal be swallowed, the amylase content proportionally increases. These experiments have been verified by C. L. Evans and in our laboratory. Bayliss and Sterling have furnished a plausible explanation of this most interesting phenomenon. According to these observers, the absorbed foodstuffs act as chemical activators of certain bodies known as hormones, which in turn call forth the secretion of a saliva especially adapted for the respective foodstuffs.

According to carefully conducted experiments by Pawlow and his pupils, the working conditions which govern the flow of saliva may be summarized as follows: The functions of the salivary glands are judiciously adapted to the respective needs, a condition which may be termed "purposiveness." The secretion of saliva occurs only when actually required; it may be caused by the irritation of substances having entered the oral cavity, and to a less extent by the sight of these substances or by psychic impressions. If foodstuffs intended to be swallowed have entered the mouth, a thick, viscid saliva, rich in mucin, is secreted, which lubricates the food bolus and facilitates its ready passage into the stomach. If, on the other hand, substances are brought into the oral cavity which are not intended as foodstuffs but are harmful, a thin, watery secretion is produced which is calculated to dilute such substances and to aid in expelling them from the mouth. The parotid glands do not secrete saliva rich in mucin, but their product is rich in its content of amylase and other ferments. If acids are brought into the oral cavity the parotid glands quickly pour out a large quantity of saliva rich in alkaline bases and albumin which is designed to dilute the acids. (See Table 2.)

It has also been established that the quantity and the quality of the secretion of all the salivary glands are most markedly influenced by the degree of dryness of the foodstuffs; the dryer the foodstuffs the more rapid the secretion of saliva. The influence of the degree of dryness of the foodstuffs is especially

noticeable in its relation to an increased activity of the parotid glands. There seems to exist a direct interdependence between the rapidity of the flow and the quantity of the chewed foodstuffs within a given period of time, *i.e.* the quantity of the irritant. (See Table 3.) A similar interrelationship is also to be observed in regard to the flow of the gastric and pancreatic juices.

While the above-noted deductions of Pawlow have been observed in animals with artificially established salivary fistulas, Mitscherlich in 1832, and Zabrowski in 1905, have verified these findings in human beings having pathologic salivary fistulas of the parotid glands. The chewing of hard toasted bread, according to these investigators, called forth a quantity of saliva which was twice

TABLE 2.—QUANTITY OF SALIVA SECRETED BY THE PAROTID GLAND OF A DOG AFTER ACID (HCl) STIMULATION OF VARIOUS CONCENTRATIONS. (*After Babkin.*)

Stimulant.	Quantity of saliva per minute.	Whole quantity of saliva.	Duration of secretion of saliva.
	Cc.	Cc.	
0.1 per cent. HCl	3.4	5.2	3 min. 24 sec.
0.2 " "	3.5	7.4	4 " 12 "
0.3 " "	3.4	8.1	4 " 48 "
0.4 " "	3.5	9.2	5 " 12 "
0.5 " "	3.6	9.5	5 " 48 "

TABLE 3.—ACTIVITY OF THE PAROTID GLAND IN MAN IN THE CHEWING OF FOODSTUFFS AND INDIFFERENT SUBSTANCES.

(*Average values after Zebrowski.*)

Foodstuffs, etc., chewed.	Quantity chewed within five minutes.	Quantity of saliva in five minutes.	Amylolytic index, in millimeters.
	Grams.	Grams.	Mm.
Soft wheat bread	45	0.38	. .
Veal cutlet	67	0.40	. .
Bread with crust	20	0.52	9.32
Fried chicken	53	0.56	8.03
Boiled potatoes	61	0.57	13.48
Rye bread	37	0.60	9.70
Hard-boiled egg (white)	82	0.61	10.29
" " (yolk)	42	0.61	14.92
Toast	10.7	0.72	9.38
Hard-boiled egg	94	0.76	. .
Fried meat	42	0.76	. .
Candy	7	0.84	7.5
Raw sour apples	52	1.18	9.54
Oranges	114	1.21	7.13
Saturated solution NaCl	. .	0.25	. .
0.25 per cent. HCl solution	. .	0.45	. .

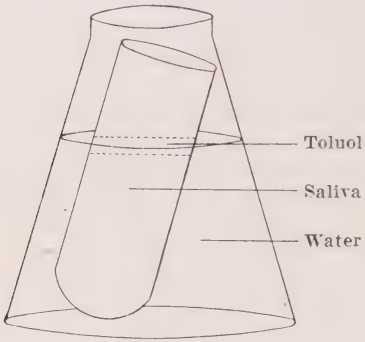
as great as that obtained by chewing an equal amount of soft wheat bread within the same period of time. These data virtually conform to the tables of Pickerill and other observers, and are in accordance with our own observations. Relative to the composition of the secreted saliva, it was observed that, in accordance with the law of Heidenhain already referred to, the quantity of inorganic salts is increased with the rapidity of the flow as a consequence of the increased intensity of the irritant. On the other hand, the quantity of organic constituents is greater in a slow-flowing saliva, on account of the lessened intensity of the irritant. After a prolonged period of fasting, saliva is usually rich in organic substances.

Carbohydrates, as a rule—depending, however, on the physical and chemical structure of their make-up, *i.e.* moisture, compactness, acid or alkaline reaction, etc.—produce a saliva rich in organic substances, principally amylase, while a pure albumin (protein) meal produces a saliva which shows no increase in its amylase content over resting saliva. As an illustration of the ready adaptability of the function of the salivary glands, the following experiment may be cited: A house-dog was fed on a pure meat diet for a month. Upon examination it was found that his saliva was practically free from amylase. This fact is merely in conformity with the absence of amylase in the saliva of purely carnivorous animals. The same dog was next fed on a mixed diet of table scraps containing potatos, bread, bones, and meat, and the presence of amylase was shown within a week after the dietary change. Indifferent liquids, as water, milk, tea, physiologic salt solution, etc., practically do not induce a flow of saliva; this is equally true in regard to indifferent substances taken into the mouth, as pebbles, sand, glass beads, etc. Acids, on the other hand, always call forth a most rapid flow of saliva rich in organic substances as well as in inorganic salts. Weak alkalis, diluted alcohol, and bitter substances do not materially increase its flow.

A most pronounced indirect stimulation of salivary secretion is produced by the act of mastication. Chewing as such, *i.e.* masticatory movements without the presence of food in the mouth, does not materially alter the flow of saliva. On the other hand, the chewing of food markedly augments the flow of saliva, by the action of the stimulating properties of the chemical and physical characters of the food bolus, by an increase of the aggregate activity of the stimuli in the bringing of the food particles over and over again into contact with the various regions of the oral cavity, and by insuring close contact of these same food particles with the taste-buds situated in the deep fissures of the circumvallate papillæ. The process of mastication is not merely dependent upon the crushing stress of the teeth, but equally so upon the simultaneously exercised muscular movements of the tongue and the cheeks. In this connection it is of interest to note that in a case reported by Jurasz, of idiopathic xerostomia (dry mouth), a rare disease affecting the functions of the salivary glands, a free flow of saliva was re-established after the insertion of a full set of artificial teeth. Apparently the trouble was started by the inability to masticate through the complete absence of the teeth.

The enzyme action of salivary amylase depends, aside from moisture and a specific temperature, primarily upon the presence of certain ions; salivary amylase is absolutely inactive in a medium deprived of its salts. This is equally true of the action of the salivary ferments of less importance, *i.e.* maltase, catalase, and oxydase. The following experiment will amply verify this statement: First, the amylolytic index of a sample of freshly secreted saliva is determined. Five cc. of the same saliva is placed in a tested Abderhalden diffusion shell, covered with a few drops of toluol to prevent decomposition, and dialyzed against distilled water. The water is changed twice a day for about a week. About 50 cc. of a 1 per cent. soluble starch solution is dialyzed against distilled water for three or four days. (See diagram.) The amylolytic in-

dex of the dialyzed saliva and starch is now ascertained, and it will be found to be practically *nil*. Absolute inactivity of amylase is rarely obtained by this process, as the last traces of sodium chlorid, its principal activator, are removed only with the greatest difficulty. If a 1 cc. sample of this same dialyzed saliva is geometrically diluted with physiologic salt solution (0.85 NaCl), according to the method described in the previous paper,* and tested with a starch solution, it will be observed that the saliva has regained its normal activity. Its amylolytic index will be practically the same,



or even higher than that of the undialyzed sample. If the dialyzed saliva is tested in the presence of sodium nitrate solution, it will be noticed that this latter substance also powerfully activates the amylase, while sodium sulfate, sodium phosphate, and sodium acetate possess very little activating influence.

Roger has stated that phosphates are absolutely necessary for the action of amylase; the writer cannot verify this statement. Roger further states that human saliva is not activated by heating for ten to fifteen minutes at 90° to 100° C., but that if a small quantity of fresh saliva be subsequently added the mixture has a much greater saccharifying action than the added saliva alone. In the writer's opinion this increased activity of the added saliva is due to the NaCl content of the boiled specimen, as described farther on. Incidentally, as Michaelis has pointed out, if a mixture of sodium chlorid and sodium nitrate be employed as a diluent of the dialyzed saliva, each substance being a strong activator, they behave in their combined action as paralyzers. It is to be observed that only the anion of the various salts is concerned as the activating factor; the cation, in all probability, plays no part in the process. Apparently there exists a certain affinity between the anion of the respective salt and the amylase, forming a more or less labile complex compound which as such acts upon the starch molecule. The activity of the newly formed salt-amylase compound is primarily dependent upon the concentration of the anions of the surrounding medium, *i.e.* the dissociation constant of the acid anions, which in turn determines the reaction of the solution. In other words, the hydrogen ion concentration [H˙] of the medium determines the activity of the salivary amylase.

Salivary amylase, being an organic compound, is completely destroyed by heat; severe cold does not harm it to any appreciable extent. Amylase is extremely sensitive to the presence of acids and alkalis, even in mild dilutions. However, very dilute acids, and to a less extent alkalis, act as activators. In round figures it may be stated that an equivalent of 0.015 per cent. HCl on the acidity range and N/1500 NaOH on the alkalinity range will kill amylase. Carbon dioxid (CO_2) in a neutral solution acts as a paralyzer; in the presence of alkalis, as in freshly secreted saliva, it partially neutralizes these alkalis and acts indirectly as an activator. Human saliva may be defined as being a weak solution of alkalis, as present in the body juices, these being more or less saturated with carbon dioxid. When saliva is exposed to the atmosphere, most of the carbon dioxid is given off, hence the difference between the amylolytic index of a fresh specimen and that of the same specimen after a few hours of exposure. As we have stated above, the presence of certain neutral salts alters the activity of the salivary ferments most markedly.

* See DENTAL COSMOS, February issue, page 140.

Of primary interest in this connection is to be noted the most remarkable influence which sodium chlorid plays as an activator. The same action is shared by many other soluble chlorid salts, *i.e.* potassium, ammonium, barium, calcium, magnesium, etc. The increase of the activity of the amylase by the addition of reasonable quantities of sodium chlorid corresponds to about five to six times its normal action; occasionally, however, we have observed an increase of about twenty times the normal. The lowest dilution of sodium chlorid which exercises any perceptible influence corresponds to a concentration of about 0.001 per cent., while its optimum may be placed at about 0.5 per cent. In eating salt-free breadstuffs, unconsciously we reach for the salt-cellar to facilitate the ready munching of the sticky food bolus by rendering it more "palatable." In reality, we activate the salivary amylase to its optimal point, and thereby quickly change the tasteless, pasty mass into a sweet-tasting semi-liquid mixture.

To readily comprehend the rôle which the hydrogen ion concentration plays in regard to the activities of salivary ferments, it is essential to possess at least a passing acquaintance with the laws governing this interesting phase of physical chemistry. "Water is an electrolyte, and dissociates into H and OH ions, which are therefore equal in number. At 22° or 23° C. $H^{\cdot} = OH' = 10^{-7}$, or $H^{\cdot} \times OH' = 10^{-14}$. If we increase $H^{\cdot}$ by adding acid, OH' decreases, because $H^{\cdot} \times OH'$ remains equal to 10^{-14}. Conversely, if we add alkali, $H^{\cdot}$ decreases, and hence we may estimate the acidity or alkalinity of a solution by determining the $H^{\cdot}$ concentration. The product of the H and OH ion concentrations is 10^{-14}, and the $-$logarithm is 14 (and is designated $-\log K_w$). In order to save space it is better to express $H^{\cdot}$ concentration as the minus logarithm (PH). Thus, according to Sörensen, if $H^{\cdot}$ concentration $= 10^{-7}$, PH $= 7$." (J. F. McClendon.) In other words, the absolute neutral point of the purest type of distilled water at about 22° C. corresponds to PH 7.

While in a future article we intend to discuss the reaction of saliva somewhat in detail, it is essential for the ready comprehension of the conditions which govern the action of its enzyme contents to state at this point that freshly secreted human saliva may be looked upon practically as a neutral liquid having usually a very faint inclination to the acid range. Its slight variations either on the acid or alkaline side of the neutral point are so minute that they do not interfere to any appreciable degree with the action of its contained ferments.

A given ferment usually reaches its maximum activity at a specific constant of H; this point is known as the isoelectric constant, and is expressed as the optimum PH of the ferment. The optimal hydrogen ion concentrations at which the so-far isolated salivary ferments develop their maximum activities as measured by the gas chain method are as follows:

Ferments.	Optimal PH.
Amylase	6.7 to 6.9
Maltase	6.1 to 6.8
Catalase	7
Oxydase	7

As the H ion concentration of a given medium also indicates its reaction, *i.e.* whether the medium reacts acid or alkaline, it is to be concluded from the above table that the optimum activities of the salivary ferments hover very close about the neutral point, with a faint inclination toward the acid range. This specific reaction, in turn, corresponds to the average reaction of freshly secreted human saliva.

40TH AND SPRUCE STS.

(To be continued.)

A Simple Form of Removable Bridge Work with Cast Clasps.

By NORMAN B. NESBETT, D.M.D., Boston, Mass.,
INSTRUCTOR IN INLAY WORK, HARVARD UNIVERSITY DENTAL SCHOOL, SPECIAL LECTURER COLUMBIA POSTGRADUATE SCHOOL OF DENTISTRY.

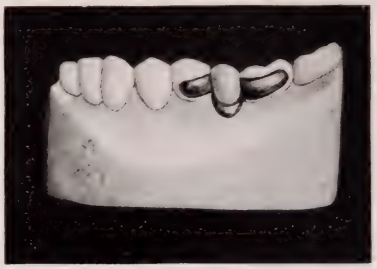
(Read before the annual meeting of the Northeastern Dental Association, Worcester, Mass., September 26 to 28, 1917.)

THREE years ago, on February 10, 1914, I began experiments which led to the perfected technique I am now bringing before this meeting. It seemed reasonable that some simple and effective form of removable bridge could be devised to fill in the middle ground between the complicated and successful but necessarily very expensive types of removable bridges, of which the Peeso is the best example, and the frequently inefficient, cheaply made vulcanite appliances with spring clasps of wire or clasp metal.

That the dental profession was in great need of such an appliance has been best evinced by the interest shown since I began my experiments and first exhibited some completed bridges. The appliance has replaced in many cases pieces of fixed bridge work and bent-clasp appliances, and in every instance of this kind the patient has reported more comfort and efficiency in chewing food. And, after all, gentlemen, you must realize that the patient has the final word on this subject.

At different times during my seventeen years of dental practice attempts had been made to furnish a substitute for one lower left first molar which I was unfortunate enough to lose in my youth. The only stipulation I made, as the abutment teeth were comparatively sound, was that they should not be cut into or ground, except a very little on the occlusal surfaces to allow for lugs. This of course barred all inlay, pin and plate and other attachments of like nature. Most of the appliances made for my case seemed to fit very nicely until I began to chew on them, and then they behaved in anything but a pleasant manner. Some would not stay in place; some, under any ordinary pressure, would be forced down and cause much discomfort; some broke after several weeks' use—and all were so generally unsatisfactory that I preferred to be without them. Nearly all the operators who tried to solve the problem said that I expected too much of any removable appliance made with clasps. I, however, did not think so, and concluded that I would make a few experiments with cast clasps, and the appliance which I have been wearing with comfort and efficiency for three years is the result of those experiments. (See Fig. 1.) Again, as I said before, the patient has the final say as to whether or not an appliance for *chewing* is efficient. I was the patient, so I *know!*

Fig. 1.



It has been my privilege, during the

three years I have been working out the technique of this bridge, to make them for several dentists to use in their own mouths, and for the patients of about twenty different dentists. I consider the report of some eighty-odd cases taken this way to be of more value than if they were all from one dentist's practice. It has also proved conclusively that the indirect method employed in making the bridge was successful, provided the steps were carried through correctly. I know this has been questioned quite a little since my first paper on this subject appeared. But in every instance where the practitioner has taken a *correct* plaster impression and obtained a *correct* bite, the bridge has gone to place with little or no adjusting, and has been useful from the first hour.

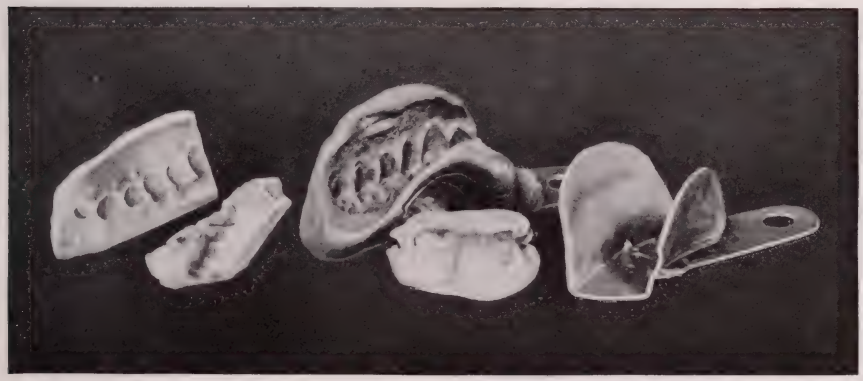
TECHNIQUE OF MAKING THE CLASP BRIDGE.

The following is the technique I have worked out, which can be used by any man with a correct knowledge of gold casting, who knows how to handle plaster and is familiar with the use of correct soldering investment and blowpipe. I must say right here, however, that the construction is *not* easy, and requires the utmost attention to detail and care in every step of the process.

The patient's teeth to be clasped are cleaned and polished, and the occlusion noted, as space must be provided for the lugs at this time, if it does not exist. Next, an accurate plaster impression is taken, and this is the keystone of the whole process, for these cast clasps have practically an inlay fit, and under no circumstances should attempts at bending be made to correct any error in fit.

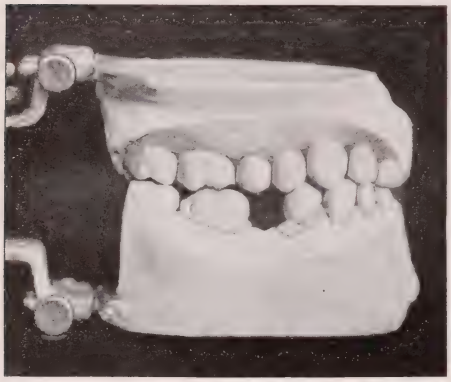
A small swivel crown and bridge tray is oiled. The impression plaster used must be mixed much thinner than for other impression work, as we wish to obtain sharpness and definition in all our tooth lines, and the stiffer mix of plaster will not flow into undercuts caused by tipped or leaning teeth. When the plaster has *started* to set, the tray is removed, and the plaster scored at suitable points so that it can be removed in sections. The plaster is allowed to complete its setting to the point where it will break with a clean, sharp fracture. The resulting sections are then removed. Several impressions must be taken in some cases having long tipping teeth before one accurate enough to be used can be obtained. Under no circumstances should an attempt be made to use a carved or otherwise "faked" model, as failure or only partial success will surely result. Next, a modeling compound impression of the opposing teeth and a small guide bite in wax are taken (Fig. 2), and the shade of teeth noted. If this data is accurately obtained the patient need not be seen again until the bridge is completed.

FIG. 2.



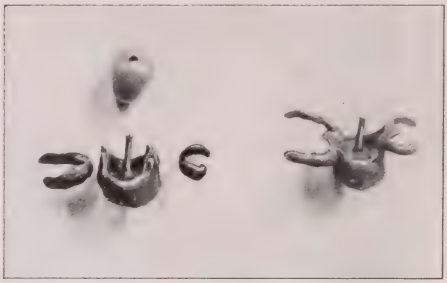
The plaster impression should be put together as soon as it is fairly dry, using the tray for a matrix or guide, for the proper position of the pieces. Personally, I find it almost impossible to get the pieces in their proper places without some slight distortion, unless I replace them in the tray and wax them to place with sticky-wax. The impression is coated lightly with shellac, then with sandarac varnish, and is set aside to harden. The teeth to be clasped are made removable, and are packed with amalgam, sinking small dowels in the amalgam before it begins to set. Care should be taken to shape and smooth these dowels so that they will draw easily, and to set them as nearly parallel as possible, so that both teeth, no matter how badly tipped, can be removed in the same plane. After the amalgam has set, the dowels are oiled and the balance of the impression packed with Weinstein's artificial stone. Plaster can be used for this purpose, but the artificial stone gives a more satisfactory working surface. The compound impression is also poured, and the two resulting models are mounted on an anatomical crown and bridge articulator, using the wax guide bite to establish occlusal relations. (See Fig. 3.)

Fig. 3.



We now have a correctly articulated model with two removable amalgam teeth, having their dowel pins in the same plane so that both teeth can be removed freely. The clasps are then outlined on the amalgam teeth, waxed up and cast. The casting is done in a cold mold, with a Taggart oxyhydrogen machine, the Taggart technique being followed throughout. After freeing the clasps from all adhering investment they are boiled in an acid bath, and smoothed and fitted to the teeth, which, being removable, make this part easier. An Ash tube tooth of proper shade is ground so as to leave sufficient thickness for a saddle. I prefer the Ash tube teeth for this type of work, because they enable me to use a maximum amount of porcelain with a minimum weight of gold framework, and because, when ground for correct shape and occlusion, they can be beautifully polished. The type of bicuspid and molar known as the Davis crown for metal work can also be used to good advantage.

Fig. 4.



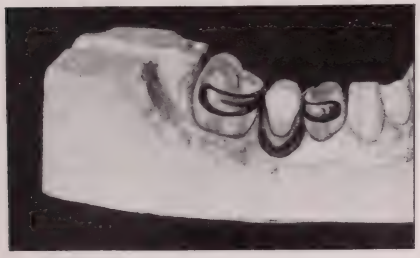
The middle section, comprising the saddle, cup for porcelain, and post, is then cast. Usually, I prefer for a post a high-fusing clasp-metal wire, No. 15 gage B. & S., picked up in the casting and afterward made doubly secure with a bit of solder. After cleaning and pickling, this middle section is placed in proper relation to the clasps on the model, plaster relations of the parts are taken, and the three parts assembled with one soldering. (See Fig. 4.) The framework is then tried on the model (the removable teeth making this easy), and any error in fit resulting from the soldering process corrected, if necessary.

To secure the best results, the joints between the clasps and the middle section

Fig. 5.

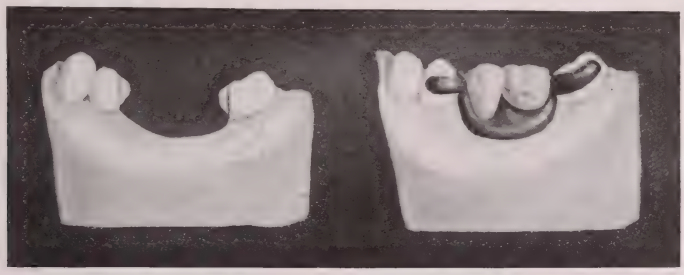
should be quite close, so that only a small amount of high-fusing solder will

Fig. 6.



be required to make a very strong union. If the clasps are as accurately fitted as they should be, any very slight change during the soldering will disturb the relations of the three sections so that they cannot be placed in correct position, and

Fig. 7.



the resulting appliance will not prove satisfactory.

Under no circumstances should the attempt be made to cast the two clasps and middle section in one casting, for while this can easily be done, no *proper clasp fit* can be obtained. The warpage and distortion of such a large irregular casting is *uncontrollable,* to say nothing of the impossibility of removing such a large mass of casting-wax without distorting the clasps. When the framework is found to fit on the model as desired, the porcelain tooth is cemented to place, and all metal work nicely smoothed and polished. (See Figs. 5, 6, and 7.) The appliance is again placed on the model and final adjustments for occlusion are made. This done, the ground surfaces of the porcelain are polished, and the bridge is ready for the patient. As stated before, if proper care and attention have been paid to every step, the bridge should require but little adjusting at the chair.

METALS USED IN MAKING THE CLASP BRIDGE.

Now just a few words as to the proper metals to be used for this bridge. It has been reported, from time to time, by various authors on dental subjects that cast clasps have no resilience, and are very brittle. This, I believe, is because the investigator confined his experiments to attempts at casting the ordinary clasp metals, high in copper content, which *are admittedly very brittle and unreliable* when exposed to the high heat necessary for casting. After quite a bit of experimenting with different formulas of clasp metal, it finally occurred to me to try Ney's elastic gold, and with the valuable assistance of Mr. L. J. Weinstein of New York, we finally evolved a new alloy for casting clasps, now known as Ney Oro casting gold "E." This metal is a combination of two of the new Weinstein formulas, known as Elastic

gold and No. 68 solder. It is nearly platinum-white in color, is unchanged by any oral secretions, making a hard, dense casting free from flaws, with considerable elasticity. It has a melting-point of approximately 1954°F., about the same as pure gold. The formula is—Gold, 65; silver, 4; copper, 9; platinum, 8.5; palladium, 12.5; zinc, 1. About 75 per cent. of all my cases have clasps made of this metal, and no breakages have been reported to date.

The middle section, carrying the porcelain, is cast with a platinum and palladium gold alloy, known as Ney's casting gold "B," the percentage formula for which is—Gold, 80; silver, 1; copper, 7; platinum, 9.50; palladium, 2.50. Melting-point, 1900°F. I prefer this alloy because it is untarnished by any oral secretions; does not appreciably change form in casting, and because 22-k. or No. 84 solder can be used without fear of melting even thin edges of the casting. The use of these high-heat solders is a distinct advantage, as it enables the operator to obtain a stronger joint, and one that does not oxidize and mar the appearance of the work in a short time. It is a well-known fact that 18-k. solder will oxidize very rapidly in some mouths, and leave a dark, unsightly joint.

ADVANTAGES CLAIMED FOR THIS TYPE OF BRIDGE.

(1) No devitalization of pulps, and usually no necessity of grinding the enamel surfaces of the teeth.

(2) An appliance that can be easily removed and cleaned by the patient. Has no troublesome tubes, slots, or sockets to be kept cleaned out, as in other forms of removable bridges.

(3) Has a maximum of stability and food-grinding surfaces.

(4) Can be constructed with a minimum of nervous strain to the patient and the dentist.

(5) Can be constructed by any operator who can construct a well-made fixed bridge; but cannot be "made to go" if carelessly constructed by the type of operator who cannot make a good fixed bridge, but who "gets away" with it because it can be jammed on with cement—and cement hides a multitude of sins!

(6) Is almost universal in application where there are two solid teeth that can be utilized, as parallelism of abutments is not necessary.

DISADVANTAGES.

The disadvantages can be summed up under one head, namely, liability of injury to the enamel surfaces under the clasps. We should select our cases for this appliance with great care, and not blind ourselves or our patients to the fact, long ago explained by Dr. Bonwill, that dissolution of the enamel and caries of the dentin under this or *any other type of clasp* will take place unless strict attention to cleanliness is observed. The fact that this type of clasp does not allow room for any appreciable amount of food débris to crowd between it and the enamel of the adjoining tooth should not lure us into a false sense of security when it is used on teeth of soft and chalky structure, or when the toilet of the mouth is neglected. I believe that with proper care and watchfulness on the dentist's and on the patient's part, time will show that no great amount of damage will occur under the clasps. And, granting that it *does* occur, can it not be easily repaired with the many methods that we have at our disposal? Surely such small damage that may come will be of less moment than the serious results that are coming from devitalized teeth, and of the two evils I, for one, am prone to choose the lesser.

In conclusion, I wish to say that this technique will not appeal to the man who wants "hurry-up" results, or who expects that this form of bridge can be constructed for a small fee. A careful tabulation of the working time required in an average case shows one hour of chair time to get data and adjust the bridge, with instructions to patient as to its care, and from six and one-half to eight hours' laboratory time.

It will, however, appeal to any patient

who has lost teeth through failure of fixed bridge work, or who has sat for hours in a dentist's chair having his teeth and roots prepared for other forms of either fixed or removable bridge work. And in this era of strenuous hustle, the patient's time is a factor that will have to receive some consideration.

125 MARLBOROUGH ST.

[See also *Discussion*, as reported under "Proceedings of Societies," this issue.]

Selection of Anesthesia for Oral Surgical Operations, and the Roentgen Ray as an Aid in Diagnosis.

By KURT H. THOMA, D.M.D., Boston, Mass.,

LECTURER ON ORAL HISTOLOGY AND PATHOLOGY, HARVARD UNIVERSITY DENTAL SCHOOL; INSTRUCTOR IN DENTAL ANATOMY, HARVARD MEDICAL SCHOOL.

(Read before the Northeastern Dental Association, at its annual meeting, Worcester, Mass., September 26–28, 1917.)

BEFORE undertaking an operation in the mouth it is important to see the patient for the purpose of making an accurate diagnosis and selecting the most suitable form of anesthesia. The two principal types from which to choose are local and general.

It is not my intention to go into details of technique, but rather to confine myself briefly to a discussion of the different points which are helpful in the selection of an anesthetic.

For operations to be performed in the office, where it is difficult to prepare the patient properly, local anesthesia is preferable. It has the advantage of freeing the region of the operation from the presence of the anesthetist and his appliances; also it eliminates the dangers attending general anesthesia, that is, swallowing and inspiration of blood and pus. Then, too, the absence of vomiting after the operation is a point in its favor, as there is no disintegration of the wound by the vomitus. Furthermore, with local anesthesia the co-operation of the patient is possible, and the hemostatic action of the injection makes the field almost bloodless, both of which factors facilitate the work of the operator.

Notwithstanding these great advantages we must nevertheless select our cases for local anesthesia. Children are usually poor subjects, although very intelligent older children prove to be exceptions in some cases. Among adults we have those who will not consent to anything but a general anesthetic, but for many patients a general anesthetic is contra-indicated. In such cases danger can be avoided by the use of local anesthesia.

The excitable, nervous, timid patient who dreads knowing what is going on and is afraid of the instrumentation can sometimes be taken care of by preanesthetic medication, such as bromural, veronal, or morphia, but as a rule does better under a general anesthetic.

The majority of dental and oral surgical operations can be performed with the intra-oral method of local anesthesia, while the extra-oral method is indicated for all extensive cases where a large area is to be anesthetized, and where the use of the intra-oral method would necessitate injection into pathological tissue.

The most commonly used intra-oral methods are the zygomatic, infra-orbital, palatal, and pterygo-mandibular injections. The principal extra-oral injections are the infra-orbital, maxillary, and mandibular.

If general anesthesia is used in oral surgery we have the choice between nitrous oxid and oxygen, ether, and a combination of the two. Nitrous oxid and oxygen has been used so long for short operations that it needs no further recommendation. However, it does not always insure an uninterrupted operation, even if administered by an experienced anesthetist, especially if the operation is of long duration. I therefore prefer ether given by one of the newer methods, as a perfect continuous anesthesia can be obtained with it. After anesthesia is induced by nitrous oxid and oxygen the patient ordinarily receives ether applied with a cone, and when sufficiently relaxed, ether vapors are administered by a pump into the pharynx, either from a tube extending back into the mouth or by the insertion of a naso-pharyngeal tube, which extends into the naso-pharynx.

Another way is the intra-tracheal method, which is very satisfactory, but more difficult in its application. The tubes are passed through each nostril into the nose and pharynx and from there into the trachea, the ether being given through a funnel filled with gauze, and connected to the intra-tracheal tubes by a larger piece of rubber tubing. The patient inhales air saturated with ether vapors, and care must be taken that no liquid ether is allowed to enter the lungs.

Fig. 1.

Large oral surgical operations should only be undertaken in a hospital, and never in an office, as it is not fair to

give a patient general anesthesia without proper preparation and after-care. As many of our operations require special apparatus, it is the general tendency to undertake too much in the office. In order to overcome this I have equipped for my purpose an operating room for oral surgical operations at one of our private hospitals, and find that patients are very appreciative of the care they receive before and after the operation, especially if they come from out of town.

In operations performed under a general anesthetic it is advisable to use an aspirator to take up the saliva and blood, and the conditions can also be improved by employing a combination of local and general anesthesia. This not only does away with the surgical shock, but by decreasing the amount of bleeding clears the field of operation.

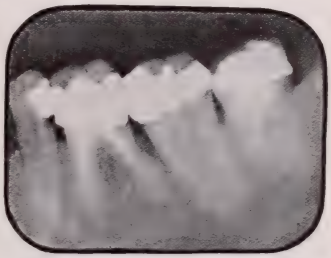
Quite as important as selecting the anesthetic is the making of a correct diagnosis. The roentgen ray is the most important means of making an examination, and in a great many cases it gives exact and accurate information. It should not, however, be entirely relied upon, and a study of the history and symptoms of the case should not be overlooked.

For lesions of the jaws and unerupted third molar teeth extra-oral plates are preferable. The small area covered by a film is quite often insufficient and misleading in its information, especially if a tooth is misplaced or if the lesion is extensive. The object to be roentgenographed should not only have its entire outline shown, but an idea should be given of its proximity to adjacent structures, and enough of the surrounding normal tissue should appear in the plate to make possible a contrast between it and the parts affected by disease.

DIFFICULT EXTRACTIONS, IMPACTIONS, AND EXOSTOSES.

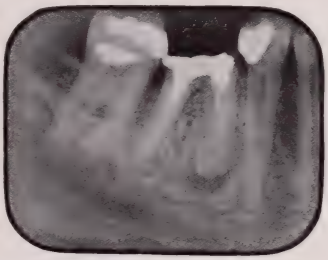
The extraction of impacted teeth is one of the most common oral surgical operations, and a good roentgen picture is absolutely necessary to plan the procedure by which it can be removed with the least injury to the remaining tissue. I prefer extra-oral plates for impacted third molars, but occasionally a film will

Fig. 2.



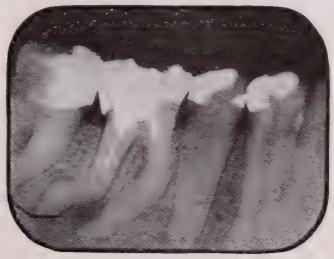
suffice. However, a negative finding on the film should always be verified by a plate, unless there is a history that the tooth has been removed. Quite fre-

Fig. 3.



quently third molars are situated so far away from their normal positions that they would not come into the intra-oral picture, and this might lead to the

Fig. 4.

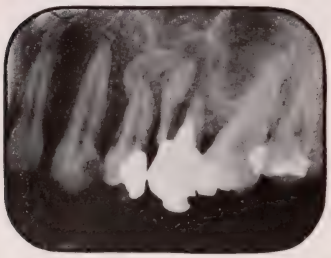


conclusion that the tooth was congenitally absent. Such a case is shown in Fig. 1. Here the film showed no third molar whatever, while on the plate it is

seen to be at the lower border of the ramus, inclosed in a large cyst.

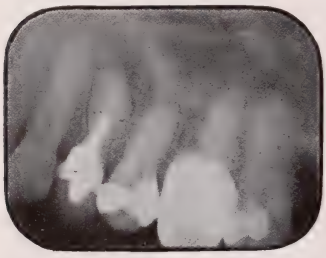
Teeth which have been devitalized for a long time often show an enlarged condition at their apices, which is known as exostosis. This enlargement is due to hypercementosis caused by the continued chronic inflammation, which stimulates the cementoblasts to form new layers of

Fig. 5.



cement at the part where the lesion occurs. Such teeth, especially if located in the lower jaw, are difficult to extract, and, as a rule can only be removed after a considerable portion of the alveolar process has been dissected away. There are many reasons why it is advantageous to diagnose such conditions by means of roentgenograms. Preparation can be

Fig. 6.



made, *e.g.*, for an operation that requires more instrumentation than a simple extraction, and there is no danger of the patient getting the idea, as sometimes happens, that the operator fractured the tooth on account of unskilfulness, and then had to resort to a long, tedious procedure, which may make him resentful and unwilling to pay an adequate fee. The operator is also able to choose an anesthetic which is sufficiently lasting.

The first molars with exostosed roots shown in Figs. 2 and 3, the curved roots of the first molar in Fig. 4, and of the bicuspid in Fig. 5, as well as the badly exostosed first bicuspid in Fig. 6, are cases in which the roentgenogram disclosed the fact that the teeth could not be removed without dissecting away the alveolar process.

BLIND ABSCESSES.

The development of the roentgen ray for dentistry made us realize the condi-

Fig. 7.

tions which may be caused by devitalized teeth in the alveolar process and the jaws. The bone surrounding the roots of such teeth is almost always more or less involved and displaced by granulation tissue of infectious nature. This loss of bone shows as a dark area in the roentgenogram, and it is important to realize that such conditions start and may grow rapidly worse without giving any discomfort to the patient or obvious signs of disease. If teeth are extracted without considering these infections of the bone, the condition may continue to exist in the mouth for many years and be a source from which absorption of pus may occur. It is therefore imperative to see

whether the tooth to be extracted is complicated by the condition commonly called a granuloma or blind abscess, and to find out its size and its relation to important adjacent structures, such as the mandibular canal or the antrum of Highmore.

Fig. 8.

Fig. 7 shows a case where the blind abscess is quite extensive, and the necessity of properly opening into such an area and curetting it is self-evident.

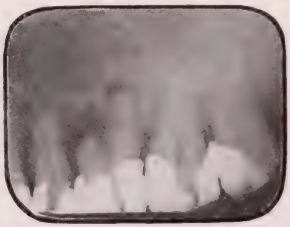
MAXILLARY SINUSITIS CAUSED BY CONDITIONS OF THE TEETH.

Maxillary sinusitis, in its acute suppurative, or chronic form, is frequently caused by infections from the teeth. According to Brophy, about 75 per cent. of all such cases are due to dental infection. Chronic maxillary sinusitis often occurs without any alarming symptoms in a manner similar to that in which blind abscesses or granulomata are formed, and it is common for such conditions to be discovered during a merely routine examination. This brings out the importance of determining the condition of the maxillary sinuses when large abscesses are found on the upper bicuspid and molar teeth. On the other hand, when a diseased antrum is found, one should always take roentgenograms of the teeth to see if the trouble is associated with disease conditions of these organs. A few illustrative cases are shown in Figs. 8, 9, 10, 11, and 12.

(Fig. 8.) Mr. W. C. had pain in

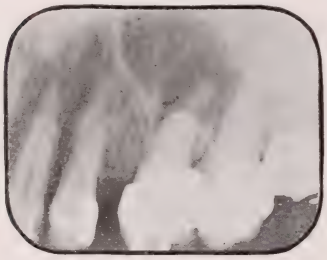
the zygomatic and infra-orbital regions with discharge from the right nostril. A frontal roentgen plate showed radiopacity of the right antrum. The cause was ascertained by a film, Fig. 9, which showed radiolucent areas on two roots of the upper first molar, indicating abscesses.

Fig. 9.



(Fig. 10.) Miss A. P. was in poor health, and was referred by her dentist for extraction of the upper left molar. After extraction of the tooth a probe could be passed into the antrum. The previously taken films of the teeth showed a large radiolucent area on the roots of the upper first molar. The second molor

Fig. 10.



was devitalized also. A frontal plate taken immediately after the extraction showed radiopacity of the left maxillary sinus and a cyst of the right maxillary sinus.

(Fig. 11.) Miss M. L. had been in a run-down condition for some time and had been under a physician's care, but did not improve. The roentgenographic examination of the teeth showed indications of many pus pockets and abscesses in the right upper jaw. The condition of her antrum was questioned, and a frontal plate showed it to be involved on that side.

Fig. 11.

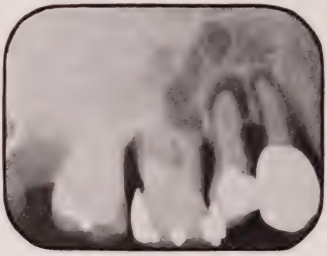
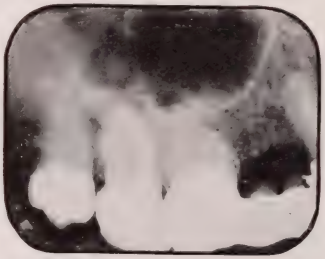


Fig. 12.



(Fig. 12.) Mrs. F. K. complained of severe pain in the head. Films of the teeth showed abscesses around the upper first molar, which was the abutment of a bridge. Involvement of the maxillary sinuses seemed possible, and a frontal plate proved this to be the case.

PERIODONTAL OR RADICULAR CYSTS.

This type of cyst is of inflammatory nature, and has its origin in an epitheliated granuloma or blind abscess. Exudates which accumulate on the inside cause an expansion of the cyst, which grows at the expense of the bone. They may grow enormously and are, as a rule, associated with a devitalized tooth. At times, however, we find cases where the cyst continues to grow in the jaw independently after the extraction of the tooth. Such a case is shown in Fig. 13. The patient remembered that he had had an abscessed tooth on that side extracted about sixteen years before, which must have been the first molar, as this was the only tooth absent. The roentgenogram

shows that the tip of one of the roots was left in the jaw and apparently also the abscess sac, which grew into an extremely large cyst. When operating I found the contents of the cyst to be under pressure, and a great deal of pus escaped after the first opening was made to the bone. This case is interesting also from the standpoint of the patient's health having been very poor on account of the condition. He had had some palpitation and dyspnea, and was evidently very anemic. He had been undergoing treatment for about a year when he broke down from nervous collapse. Before the operation the blood count was as follows: Hemoglobin, 85 per cent.; leucocytes, 7000; red count, 5,120,000. One week after the operation his physician reported the count to be—Hemoglobin, 92 per cent.; red count, 5,500,000. Six months later his blood count was again taken, with the following result: Hemoglobin, 93 per cent.; leucocytes, 6000; red count, 5,800,000.

Fig. 13.

DENTIGEROUS OR FOLLICULAR CYSTS.

Such cysts are not of inflammatory nature, but are of embryonic origin, developing from the tooth follicle of an unerupted impacted or misplaced tooth or tooth germ, and they may contain one or many elementary teeth or well-formed tooth masses. They also grow to tremendous size, and the roentgen picture is one of the best means of making a differential diagnosis. Such a case is seen in Figs. 1 and 14 (shown by courtesy of Dr. Halsey B. Loder). The patient, a boy twelve years of age, had a swelling on the right side of his face. This was confined to the ascending ramus of the jaw, and had been noticed

for nine months, there being also a slight amount of pain. The roentgen picture shows a well-formed cyst containing a number of defined teeth and small foreign bodies, which, being of about the same radiopacity as the teeth, were taken to be indefinite tooth particles.

Fig. 14.

It was my aim in preparing this paper not to go into the details of the technique of administering anesthetics and performing surgical operations in the mouth, but rather to discuss some features of oral surgery about which the general practitioner is usually the first to be consulted by the patient. I refer to the making of a diagnosis and the selection of the anesthetic, a discussion of which I thought could be made clear in no better way than by showing these roentgen pictures of some practical cases which have come under my observation.

43 Bay State Road.

[See also *Discussion*, as reported under "Proceedings of Societies," this issue.]

The Presence of Taste Fibers in the Lingual Nerve.

By ISADOR H. CORIAT, M.D., Boston, Mass.

(*From the Surgical Department of the Forsyth Dental Infirmary for Children.*)

THE question as to which nerve subserves the sense of taste in the anterior portion of the tongue has been one of the most contested problems in nerve physiology. Experimental and anatomical data leave no doubt that the posterior portion of the tongue receives its peripheral receptors of taste from the glosso-pharyngeal nerve. For the anterior portion, however, opinions have been divided between the lingual branch of the fifth nerve and the chorda tympani.

The mucous membrane of the tongue is innervated not only with nerve endings subserving the sensations of touch, pain, and temperature, but likewise with nerve fibers which pass directly to the specialized groups of taste buds, which may be termed, according to Sherrington, peripheral chemo-receptors.

Physiologists are not in accord on the subject of the innervation of the anterior portion of the tongue by the nerves of taste. Tigerstedt leaves the question open, Haycraft in Schaefer's Physiology states that the taste fibers from the lingual nerve pass into the chorda tympani on their way to the brain. The conception that the taste fibers reach the brain exclusively by the fifth nerve roots was held long ago by Erb, and later strongly advocated by Gowers and Turner. On the contrary, other physiologists (Howell, Herrick) claim that the taste fibers are merely carried in the lingual nerve, and brought to it through the chorda tympani nerve.

It has further been pointed out that the loss of taste after operations on the Gasserian ganglion is merely temporary, an incidental result, due probably to post-operative degeneration and swelling of the fibers of the lingual nerve, which affects the conductivity of the intermingled fibers of the chorda tympani. It will be shown later, however, that this loss of taste is permanent and that, coincident with this, there is complete loss of all sensation over the distribution of the lingual nerve.

Most of the data on the nervous pathways and the peripheral receptors for taste on the anterior portion of the tongue have been derived from these operations on the Gasserian ganglion, the end-results of which operations as affecting the sense of taste have been severely criticized as complicating the evidence, on the ground that such operations produce only temporary changes, due probably to post-operative degeneration and swelling of the nerve fibers, which affects the continuity of the nervous pathways and consequently affects the peripheral chemo-receptors for taste. In the experiments here detailed such post-operative injury was avoided, partly because only the mandibular nerve was injected with novocain, and partly because an isotonic solution was used (Ringer's solution). Furthermore, the tests were made on children, in whom there is a greater and more accurate sense of taste than in adults.

According to Cushing,* whose conclusions are mainly derived from extirpation of the Gasserian ganglion, the taste fibers for the anterior two-thirds

* Harvey Cushing: "The Taste Fibers and Their Independence of the Nervus Trigeminus," *Johns Hopkins Hosp. Bulletin*, vol. xiv.

of the tongue are independent of the nervus trigeminus, since the perception of taste was never found to be completely and permanently lost after removal of the Gasserian ganglion. He admits, however, that there may be a temporary loss of taste over this area, due to mechanical or toxic disturbances from degeneration of the lingual nerve. After operations on the Gasserian ganglion taste was always unaffected on the posterior portion of the tongue. This latter observation is in harmony with my observations after mandibular injections with novocain in isotonic solution. Krause and other observers, however, have found a complete and permanent loss of taste on the anterior two-thirds of the tongue after operations on the Gasserian ganglion.

That the sense of taste may be completely and permanently lost on the anterior two-thirds of the tongue, but preserved on the posterior third (because the latter is supplied by the glosso-pharyngeal nerve) for a long period after extirpation of the Gasserian ganglion is shown by the following personal observations:

A woman, fifty-seven years of age, had been operated for severe trigeminal neuralgia of six years' duration. The entire right Gasserian ganglion was removed. The sensory examination three and one-half years after the operation revealed the following: The entire right side of the face, lips, and mucous membrane of the mouth and tongue, with the exception of the posterior third of the latter, was completely analgesic and anesthetic. The right anterior two-thirds of the tongue showed no sensation to touch or pain, while taste was completely lost for salt and acid on this portion of the tongue. On the left anterior two-thirds of the tongue, as well as the entire posterior third, taste and sensation were normal. Here it will be noted that the loss of taste had persisted, although more than three years had elapsed since the operation.

The chief criticism that must be directed toward the theory that the distribution of the taste fibers is in the anterior two-thirds of the tongue is that the deductions are based on the effects of severe operations on the Gasserian ganglion, or on the more or less indefinite tests for taste in the course of examinations for peripheral facial paralysis in which it was felt that the chorda tympani was involved. In none of these latter cases was taste completely obliterated in the anterior two-thirds of the tongue. At the most, the perception of taste was merely diminished.

It was felt that if an exact and definite physiologic experiment could be devised, such an experiment would serve to clear up the much-discussed question of the exact nerve which subserves taste on the anterior portion of the tongue. Fortunately, such an opportunity was offered by studies carried out at the Forsyth Dental Infirmary for Children.

All the subjects observed were children between the ages of ten and sixteen years. In children, as is well known, the acuity of taste is more pronounced than in adults. These children came to the Infirmary for the extraction of teeth under local anesthesia by what is known as mandibular injection. The local anesthetic used was a 1 per cent. solution of novocain in isotonic normal salt solution with adrenalin. The injections were made in all cases at the inferior dental foramen, producing anesthesia of the area innervated by the inferior dental nerve and the inferior dental plexus. In all the cases some of the injected fluid infiltrated into the lingual nerve, and there followed also a complete analgesia and anesthesia of the anterior two-thirds of the tongue on the side of the injection, with a complete loss of taste.

Sensitiveness to touch was tested with cotton or with Von Frey's hair esthesiometer, to pain with a sharp point, and to temperature with small test tubes, while the sense of taste was tested with sweet, sour, bitter, and salt placed on small pellets of cotton.

In these mandibular injections the lingual nerve is involved probably by a branch of the inferior alveolar nerve. This branch of the inferior alveolar

nerve joins the lingual nerve shortly above the inferior dental foramen and thus produces sensory disturbances in the tongue. In none of these injections was the mouth dry on the injected side, because the chorda tympani was not involved, although it is intimately related to the lingual nerve. A blocking of the chorda tympani by the novocain would have the same effect as atropin, particularly since the isotonic solution used contained adrenalin, which would stop the secretion of saliva by constricting the bloodvessels of the salivary glands. The local anesthetic was injected into the inferior dental foramen, and not into the lingual nerve, therefore the sensory disturbances which occurred in the distribution of the lingual nerve were due to infiltration and not to direct injection.

Why, then, after severe operations on the Gasserian ganglion or following mandibular injections, is not taste from the chorda fibers preserved, if there exists a separate sensory pathway by way of the chorda tympani? The reply to this question would be that the taste is absent because the great mass of taste perceptions is conveyed by the lingual nerve together with the impulses for pain, touch, and temperature. Even if all sensation in the lingual nerve were blocked, taste would not be affected if the lingual nerve did not carry taste fibers, because there would be a selective sensory transmission if the two pathways were distinct, that is, taste sensation would be completely preserved if the chorda tympani alone carried taste fibers, even though the lingual nerve were blocked and rendered completely anesthetic. If taste fibers ran exclusively in the chorda tympani, there would be a dissociation of sensation (preservation of taste with loss of sense of touch and pain) after mandibular injection, like the dissociated anesthesia in syringomyelia or the selective sensory regeneration of nerve fibers.

Without entering into the details of the individual experiments, they may be summarized as follows: In all, twenty-one obervations were made on children between the ages of ten and sixteen years. Seven of these were left mandibular injections, six right mandibular injections, and eight double mandibular injections. In all these cases, on the anterior two-thirds of the tongue, either on the right or left side or on both sides, according to the nature of the mandibular injection, there was a complete loss of sensation to touch, pain, and temperature. In every case likewise, there was a complete loss of taste for sweet, sour, and salty objects over the area of the tongue where the other sensations were lacking. In each case, fifteen minutes were allowed to elapse in order that the local anesthetic might reach its full point of intensity. In some of the observations, the anterior two-thirds of the tongue would sometimes show only a diminished sensation for touch and pain, while in this same area taste would be completely lost.

Observations such as these demonstrated that the taste fibers become blocked before the fibers for touch and pain—first, because the former are more highly differentiated, and second, because the lingual nerve must contain taste fibers; otherwise no diminution of taste sensation would have taken place over the distribution of the lingual nerve. This is in harmony with my observations on selective sensory regeneration, in which it was demonstrated that the fibers for light touch are regenerated later than the fibers for pain, because they are more highly specialized and differentiated.* In none of the cases was taste or sensation disturbed on the posterior portion of the tongue.

In one experiment the subject was able to distinguish salt slightly, but unable to perceive sweet. This was probably due to the persistence of special neurons which subserve the function of tasting salt. There was temporary blocking of the "sweet" peripheral receptors—

---

* See my papers on "Selective Sensory Regeneration in an Ulnar Nerve Lesion," *Journ. A. M. A.*, February 5, 1916, and "The Sensory Evidence of Nerve Regeneration," *Boston Med. and Surg. Journal*, February 8, 1917.

a sort of selective apparatus for different taste qualities, the same as the selective sensory apparatus in the skin (Von Frey, Head, Coriat). Frankl-Hochwart has also pointed out that there may be selective receptors for different taste qualities on the tongue, an observation that is confirmed by one of our experiments.

To summarize, as the result of isolated mandibular injections with novocain for the extraction of teeth, which is in the nature of an exact physiological experiment, it was found that the fibers for taste in the anterior portion of the tongue pass through the lingual nerve, at least in its peripheral portion, before they join the chorda tympani.

416 MARLBOROUGH ST.

The Relation of the Surgeon and the Dentist in Face and Jaw Injuries.

By HERBERT L. WHEELER, D.D.S., New York, N. Y.

(Read before the Northeastern Dental Association, at its annual meeting, Worcester, Mass., September 26–28, 1917.)

THE value of the dentist and oral surgeon in caring for the wounds of the face and jaws of combatants in the present world-war can scarcely be estimated. The results of the attempts at restoration of mutilated faces, in which dentists co-operated with the surgeon, were so satisfactory that the people of all the allied countries immediately appreciated it, and at once gave the proper credit to the dentist as well as the surgeon. The plastic and oral surgeon and dentist have achieved such results that the work done by them in co-operation will always stand out as one of the advances over the past brought out during this war. Intelligent and fairminded men in both branches of medicine, surgery and dentistry, rejoice at the increased usefulness of the service of our profession to humanity. The work of this kind done at the American Ambulance at Neuilly and at many other points in France by American, French, and English dentists and oral surgeons has begun a new era in the requirements that will be made henceforth upon the dental profession. Such men as Drs. George B. Hayes, William Davenport, V. H. Kazanjian, Frey, Villain, and many others, have shown that dentistry is something more than mechanics. They have demonstrated that the dental profession does contain men who can rise to the occasion, and meet the responsibilities of any reasonable emergency. They have done more; they have shown that dentistry has a mission quite as dignified and useful as its sister specialties of the medical profession. Not but what we, as a profession, have appreciated this, but the public have not always done so.

INCREASED RESPONSIBILITIES OF THE DENTIST.

This new appreciation, however, besides giving us a sense of satisfaction, carries with it increased responsibilities. Will the members of the profession rise to the occasion and meet the requirements? Only a few have done so thus far. I have faith, however, that we shall "make good." It is the object of this essay to point out in some small measure some things in which we need to develop

greater efficiency before we can measure up to the best surgical standards of the present day.

The work of the dentist is of such a character as to develop the very highest finger ability. The dentally trained oral surgeon should have the greatest technical ability. Finger dexterity, however, is of no value unless the mind that directs the fingers has a thorough knowledge of the fundamentals. We must know the structure, the muscles that produce movement, the arteries and veins that supply nourishment and carry off waste, and the nerves that direct movement. We must know the growth, development, and cellular tissue of all these, and not only know them, but remember them. How would the plastic surgeon know where best to attach new tissues or place sutures, if he had not a thorough acquaintance with the tissues with which he is dealing?

As far as I am able to judge by my relations with hospitals and institutions, from such fracture cases as I have seen handled by the surgical wards it is evident that the practitioner of medicine and surgery expects the conditions of the mouth to be cared for by dentists, and acting on this hypothesis, the majority of them pay very little attention to mouth conditions except those of malignant growths or benign tumors. Their sole recourse in case of fractured mandibles or dislocations of the maxillary bone is usually the Barton bandage, or some other method of that type.

I believe that most dental colleges today are giving very satisfactory courses in oral surgery, and that a knowledge of fractures of the mandible and maxillary bones, and their treatment, is pretty carefully taught, and if a student leaves the average institution without a fundamental knowledge upon this subject it is largely due to his own neglect. In treating traumatisms of any kind, a competent dentist should be capable of doing the necessary and intelligent thing. In the injuries and mutilations, however, that occur on the fighting front in Europe, the injuries received are almost never confined to a simple fracture. They are practically always compound or comminuted fractures, plus serious lesions of the soft tissues of the face and mouth, and sometimes other portions of the head and neck.

NECESSITY OF CO-OPERATION BETWEEN THE ORAL SURGEON AND OTHER SPECIALISTS.

One reason why the American Face and Jaw Hospital, which started off so nicely, was bound to fail, as it has, was its attempt to handle exclusively face and jaw cases. Theoretically this plan seemed good, and promised well. Practically, the Huns have never been considerate enough to use explosives and death-dealing missives that would injure in one spot only, and a man might be brought to the hospital not only with a seriously mutilated face and jaw, but with an arm or a leg gone, or serious wounds of the body, as I have seen, and a hospital without all the equipment and staff of resident physicians and dentists to take care of these needs was doomed to failure from the start, though this did not appear to those who so conscientiously gave of their time and money to establish the institution.

You will see, then, that it is necessary to have all the injuries treated simultaneously. You will also know, if you are acquainted with the training of the dental profession, that few if any dentists are capable of attending to the flesh wounds or doing plastic surgery in conjunction with their bone and fracture work. How many men, do you think, in an audience composed of dentists, if they were asked what material was most desirable for suturing wounds, could answer immediately? How many could tell you how long sutures should be retained before being removed, and in what cases they were not to be removed at all? How many could tell by observation which tissues had best be sutured, and which are best brought into proximity in some other way? In fact, how many dentists could carry on a treatment outside of the vestibule of the mouth? I think you will agree with me that there

are very few. Hence the surgeon, the man accustomed to dealing with wounds of the tissues, is a necessity, and as soft tissues heal and disintegrate more rapidly than bony structure, it is evident that it is essential that the plastic surgeon shall have direction of the case until the soft tissues are healed or sufficiently attached to insure safety from a reopening of the wound.

Furthermore, how many dentists do you think can give you accurately the blood supply of the face and jaw, and the nerve supply, and tell you whence it arises, and could go at once unerringly to the place for proper ligation in case serious hemorrhage should occur? Lack of such knowledge, however, does not reflect upon the ability of the dentists to understand thoroughly the tissues of the vestibule of the body, the mouth, and be able to diagnose dislocations, fractures, infections, necrosis, caries, neoplasms, and traumatic injuries of all kinds, plus a knowledge of the necessary mechanical appliances—one might say, engineering equipment. To replace lost parts is a task worthy of a well-equipped surgeon, therefore the dentist need not apologize for being unable to take up instantly plastic work and carry it on. He should, however, have an appreciation of the distinction between the necessity for quick action and healing by first intention of soft tissues and the necessary preparation for mechanical artificial substitution, and should work harmoniously and in sympathy always with the plastic surgeon.

The difficulties of plastic work, especially when it requires grafting of new and foreign tissue on a part, are such that the nourishment, care, and activity of the patient must all be carefully considered; therefore again the plastic surgeon is entitled to direction of the case. This also obtains in bone-grafting, and if the oral surgeon attends to the bone-grafting, the same privilege should be accorded to him. In other words, the direction of those forces which make for a proper upbuilding of the patient's strength and feeble powers, which must be considered in any recuperation from injury or disease, must go hand in hand with a knowledge of the technical ability which seeks to repair or replace.

It is unquestionably the function, then, of the general surgeon, who is undoubtedly the best qualified as a specialist in plastic surgery, to have the direction, care, and control of these seriously mutilated face cases, as it is the duty of the oral surgeon to care for fractures or loss of the bony tissue. If the best results are to be obtained they must work in unity. Even the man who attends to the extraction or replacement of artificial teeth must become a part of the harmonious whole and must consider the condition of the osseous and soft tissues before attempting to insert artificial substitutes or treat disease conditions of the alveolar process or roots of teeth.

DENTISTRY AS A SEPARATE DEPARTMENT OF THE ARMY.

It would seem, then, that the idea of some men that dentistry should have a department connected with the army exclusively its own is not based upon a thorough knowledge and understanding of the requirements in face and jaw wounds. I sometimes wonder if some of those who shout so loudly for the independence of the dentists in these matters have not an idea that you can send your poor wounded, mutilated, nerve-racked soldier about from pillar to post, as some dentists do their patients in an attempt to confine themselves to what they are pleased to call a dental specialty.

You may know that the United States Government, through the Surgeon-general's Office, is contemplating, and I think has already organized some *head* units. The government has at no time attempted to create a head unit exclusively of surgeons or exclusively of dentists. It has placed a number of both oral surgeons and dentists in each head unit, guided evidently by the intelligent conception that in order to get the best results and make the most complete cure of the unfortunate victims of this war they must all work together. In this I am quite sure that you will all agree

with me that the Surgeon-general's Office has shown marked ability to appreciate the situation. You will also find in it, I think, cause to strengthen our belief that dentistry is and must be a branch of the healing art, or we are mere mechanics.

If we are mere mechanics or beauty doctors, our position is with the barber, the manicurist, and the chiropodist. If we are followers of the healing art, we must of necessity have a thorough knowledge of the histological and anatomical structure of the tissues and organs we have to deal with. We must have a thorough knowledge of the difference between normal and pathological conditions of these tissues, and must be able to differentiate, that is, we must be diagnosticians. We must also understand the effects of the presence of foreign substances or invasions of injurious bacteria; we must know our blood supply and our nerve supply, and the effects of injury, also the effects of remedies. A knowledge of these things is what is being given in good dental colleges today. A recognition by the dental profession that the teaching on these subjects was not sufficient brought about the four-year course in dental colleges which became operative at the opening of the present session of all the dental colleges of this country;—and even with a four-year course the time is all too short to impress upon young and often thoughtless students the necessary details to supply them with a working knowledge of the tissues they are expected to care for.

It may interest you to hear from me some comments on my experience as an examiner of applicants for commission in the dental section of the Officers Reserve corps of the United States army. In New York we have examined upward of six hundred men who have applied for commissions, and our examination has been a fair one. It has been based upon a desire to give the Government that which it needed, expert service as dental and oral surgeons, and to be fair to the applicants without regard to race, creed, or color. No man has come before our board who has not had to undergo an examination as to his knowledge of fundamentals and as to his mental and technical equipment to serve his government in the way he aspired to do.

We have found that in a majority of cases dentists who have been more than a year away from their alma mater are seldom able to answer questions as to the blood and nerve supply of the face and jaw in detail. We have found less often, but all too often, that they did not know the muscular attachments or even the muscles of mastication. We have found often that men who claimed to be specialists in extracting did not know which was the thinnest plate on the alveolar process of the maxillary bone or the mandible, a thing that any man with experience in extracting could not help but observe.

Some men having listened to the answers that we have listened to since last May would have unhesitatingly and unqualifiedly condemned our teaching institutions in dentistry. Let me tell you that it has made no difference where a man was graduated, whether from the most famous universities in the country or the most obscure private colleges, the knowledge of fundamentals becomes rapidly rusty—in many cases soon after termination of the required course in the dental college. I am convinced that it is not due to lack of teaching. I am sure that the quality and quantity of teaching upon this subject in most dental colleges is sufficient to well equip a man, if he desires to know and to remember the subject. The difficulty, I am satisfied from questioning and cross-questioning, is with the individual.

NECESSITY OF MORE INTEREST IN PROSTHETIC DENTISTRY.

There is scarcely a teacher in a dental institution in the country who will not agree with me when I say that the ambition of the average student who enters the dental college is not sufficiently great for him to appreciate the necessity of an intimate knowledge of the tissues he must work upon. They are all desirous of putting in gold fillings, gold inlays,

filling root-canals, and vying with each other in putting the finest polish on their fillings, and perhaps doing the most beautiful plastic work or making the most natural-appearing porcelain substitutes. Occasionally you find one who is desirous of knowing and understanding prosthetic work, but the majority of them will do everything possible to put in most of their time in the operating department and at the operating chair. They will only study sufficiently to enable them to pass the examinations; they look upon anatomy, physiology, histology, materia medica, chemistry, therapeutics, etc., as studies which they care nothing about, except to be able to answer some set questions that will be presented to them at the end of each term, and enable them eventually to secure the coveted diploma. They seem not to be able to reason from cause to effect or to know that a thorough knowledge of the groundwork is more desirable than influence or clever advertising.

I know not if anyone is to blame for this; probably not, only weak human nature. Even prosthetic dentistry is evaded as far as possible. They say, "Well, I can get that done outside at the dental laboratory. Why bother with that?" As I know something about the prosthetic work in dental colleges and as I lecture upon that subject in one institution in this country, I have endeavored to impress upon the minds of the young men the fact that a thorough knowledge of the mouth, its histology, its anatomy, its physiology or function, the mechanical principles of the action of the mandible, and an ability to restore lost parts by artificial substitutes that accomplish the function which the original or lost part accomplished is a greater achievement than all the operative dentistry in the world, and I think mouth conditions resulting from the present war have borne out my opinion on that subject.

NEED OF MORE PROSTHETIC DENTISTS IN THE ARMY.

The United States Government today has more dentists commissioned than it will need if the war is continued three years, but it is begging and imploring men with only a little knowledge of oral surgery and a genius for prosthetic restoration to accept commissions and serve their country.

What is to be the remedy that will give the dentist a proper view of his responsibilities, and teach him unerringly the requirements that he must have to attain his desire to be of service to his community as a professional man? I think the remedy must lie, first, possibly in a more distinct and plain statement of the true situation, beginning with his freshman year, and of the necessity for deep-rooted knowledge of these subjects, not surface information to be forgotten as soon as his state board examinations are over. I believe, next, that a closer and more intimate relationship must be cultivated between the dental specialty and other specialties of medicine. They must realize that each forms a part of a whole, and that each is as dignified and as worthy of respect as the other as long as each does its work well —and by well, I mean that the results shall evidence a complete knowledge of the subject of which they assume to be masters. Often the training of men in this field seems to detract from their ambition to do mechanical work. This is unfortunate, for to be of any great service in this mouth and jaw work, a dentist must not only be an oral surgeon, but must be a good prosthetic dentist. And while it is not required and not necessary that he should mechanically make and shape parts in order to have them made and shaped as he wishes, he must be master of the situation and thoroughly capable of doing so in case of necessity.

To sum up the situation, then, it is necessary that the general surgeon work in co-operation with the mouth surgeon and the prosthetic dentist to properly handle these mutilated cases that arise from face and jaw wounds at the battle front. The oral surgeon and the technically competent mechanical dentist are also essential. Neither one can carry to completion the necessary work without

the assistance of the other; nor can one be in full sympathy with the other without a proper understanding of the responsibilities and work of the other. Therefore not only should the oral surgeon and the prosthetic dentist have a thorough knowledge of the fundamentals involved in the entire range of injuries that occur in the face and jaws, but the general surgeon should also have a knowledge of the requirements of the oral surgeon and prosthetic dentist. The difficulties that sometimes arise in this combination are not always entirely the fault of one specialty. Frequently narrowness on the part of all is responsible for them, and most often a willingness to work so as to be of assistance to the other would overcome the difficulties.

Let us keep in mind, then, that the primary cause for all of this work at the present time, dental departments in base hospitals and head units for base hospitals, is to bring back to normal condition, as far as possible, the man who has been frightfully mutilated and injured because of his patriotic service to his country. Let us ignore what we conceive to be personal rights and dignity, and forget all in an endeavor to help the man who has sacrificed all.

560 Fifth Ave.

[See also *Discussion*, as reported under "Proceedings of Societies," this issue.]

Method of Taking Modeling Compound Impressions with the Mouth Closed and Under Normal Biting Strain.

By JOHN H. DREXLER, D.D.S., Philadelphia, Pa.

(Read before the Academy of Stomatology of Philadelphia, November 27, 1917.)

My object in coming before you with this paper is to give to you in a simple and effective manner the method of taking impressions with the mouth closed, and under normal biting stress.

A few moments of careful thought on this subject will convince one that the usual method of taking impressions is decidedly wrong when dealing with soft or movable tissue, as also is the idea that an air-chamber in the center of an artificial denture is essential to secure it against the strain of mastication.

The greatest comfort in a denture can only be obtained when you have equalized the bearing on the soft and hard tissues alike, while they are in their working position. Hence this equalization must be done in the impression with the mouth closed and under normal biting stress; and in order that there may be no doubt about the finished product, the so-called impression must be the exact model of the proposed denture, as far as the height of the rim, thickness of the edges, and length of the plate in the rear are concerned.

In preparing to take an impression by this method, we first examine the mouth, both opened and closed, by passing the index finger along the buccal and labial region of the ridge, also along the posterior portion of the vault, to get an idea of the height of the rim and the length of the proposed denture by noting the strength and position of the muscles and soft tissues in action. We should also note particularly the amount and area of soft tissue in the posterior third of the vault.

We next select a suitable impression

tray. The tray must fit the vault exactly at the rear edge, and the buccal and labial borders of the ridge approximately, allowing about one-eighth of an inch on each side to accommodate the modeling compound.

The buccal and labial edges of the tray must be trimmed one-eighth of an inch short of the muscular attachments to allow for muscle trim. When the ridge is hard in front, the tray must be trimmed to the exact length of the proposed plate, that is, within one-sixteenth of an inch of the edge of the vibrating soft tissue. If the ridge be soft in front, then the tray must be fitted to within one-eighth of an inch or less of the full length of the proposed plate.

The handle of the tray is bent in such a manner as not to interfere with the lip or with the finger when placed on the rear third of the tray. If the patient is subject to nausea, the posterior edge of the tray must be embedded sufficiently to eliminate vibration of the soft tissues, and the tray in this case should be the exact length of the plate to be.

With a mental photograph of the mouth and a tray properly fitted and dried, we next turn our attention to the modeling compound.

PREPARATION OF THE MODELING COMPOUND.

The only reliable heater for heating modeling compound is an electric heater which allows three grades of heat—low, medium, and high. With this apparatus the compound can be made extremely soft without boiling, and an even temperature may be maintained indefinitely. Modeling compound should never be boiled.

We next take from our heating-pan a small portion of compound, and with moistened fingers form it into a ball. Heat one side in the flame until it sizzles, and place it on the tray with the heated portion next to the tray, and after again moistening the fingers, quickly shape the soft compound into a mound in the center of the tray with a depression all along where the alveolar ridge will come, and with a relatively high ridge to go up under the lip and cheek. The compound should not be allowed to extend quite to the posterior border of the tray.

We now heat the entire impression surface of the compound over a Bunsen flame, so that the surface may be rendered softer than the underlying portion, and after dipping the entire impression material into hot water we are ready to take our first impression. Right here let me say that it is essential that compound heated by dry heat should always be dipped into hot water before being placed in the mouth. This will prevent sticking to the mucous membrane, and incidentally possibly save your patient from a severe burn.

TECHNIQUE OF TAKING THE IMPRESSION.

The object of the first impression is to fit the compound to the roof of the mouth only, and to get the height of the rim.

The tray is passed into the mouth and pressed about half-way home with a wavelike side-to-side motion, and centered. The compound on the buccal and labial surfaces is pressed upward and against the ridge by using the finger. We now instruct the patient to give the motion to the lip and cheek, first as in hearty laughing, then as in whistling, while we gently push the tray home with the index finger under the rear third; then, while the material is still moldable, massage in the region of the tray to make surplus compound flow underneath. In massaging, the first motion is upward, and the second straight inward and forward. When thoroughly hard remove the impression, and place in a pan of cold water.

The margins of the impression, as it first comes from the mouth, are generally thick enough to distend the tissues of the cheeks and lips, a condition which must be remedied.

We next trim the buccal and labial margins until they are of the thickness desired in the finished denture to give the patient's face the desired expression. Care should be taken not to alter the

form of the margins or to break the compound. If the compound is broken in trimming, no effort should be made to repair it until after the bite is taken, as any attempt to repair it before that stage is reached usually results in spoiling the impression. If the posterior margin of the impression cup is exposed in taking the impresssion, it should be bent backward out of contact with the tissues. The exposed area will later be covered with compound.

TAKING THE BITE.

The taking of the bite, which is the next step, is of vital importance, and differs slightly in technique for a case requiring a full upper and lower denture from that for a case requiring a single denture with the upper or lower teeth in place.

Owing to the limited time, I am compelled to confine my paper to one class; we shall therefore consider taking the bite for a full upper denture with the lower teeth in place.

Before attempting to complete the impression, the biting pressure on both sides of the plate should be equalized. This is done by rolling out a piece of compound, and after passing it through the flame, sticking it to the under surface of the tray. Quickly shape it to approximate the lower teeth, heat until it is very soft, dip into hot water, and place in the mouth. The patient is now requested to bring the lips together until they assume the rest position. At this point let me emphasize the necessity of having the compound so soft that the patient does not notice any pressure when closing. If the compound be heated unevenly, the muscles straining on one side or the other to overcome this resistance will produce a false bite.

The bite is now removed and all surplus trimmed off, leaving only the very slight dents indicating the cusps of the lower teeth. The biting surface is again warmed over the flame equally until the heat has penetrated about one-eighth of an inch in the molar region and one-sixteenth of an inch in the region of the six anterior teeth. The bite is placed in the mouth being sure that the lower teeth bite into their original markings in the compound, and the patient instructed to close down firm and hold the jaws in the rest position.

Up to this point we have produced something which we know will compel the patient to bite in exactly the same way every time we request him to close. This is absolutely necessary in order that we may modify the margins, or, in other words, get the muscle-trim.

MUSCLE TRIMMING.

The finishing or last step in this procedure is accomplished by modifying the margins of the impression to conform to certain portions of the soft tissue under normal biting strain.

The first step is to make sure that the margins are high enough. The experienced operator will be able to detect low places in the margins of the impression at a glance, but the inexperienced cannot do this.

In the first cases one attempts it is well to add compound by heating a stick and building up all along the margins. Quickly insert after heating to see that the bite is correct, and to have the patient perform the laughing and whistling movements while the cheeks are gently massaged.

As soon as the margin is high enough all around and has been muscle-trimmed and massaged, the entire buccal and labial margins should be warmed beside a small flame until the compound is soft enough to permit adaptation by massage, but not soft enough to change its form. The impression should be quickly inserted in the mouth, the patient asked to again make laughing and whistling movements, and the compound massaged to a better adaptation to the buccal and labial tissues.

It is also very important that the upper impression should be adapted to the soft tissues which overlie the posterior part of the hard palate on either side of the median line when these tissues are relaxed.

Impressions taken with the mouth open reproduce these tissues in distended positions. When the mouth is closed they occupy very different positions, and a denture made over a model representing the distended positions may fit them so poorly as to cause nausea. If the denture fits these tissues in their relaxed position it will be stable at all times, and will not cause nausea, no matter how long it may be.

The impression is adapted to the relaxed position of these tissues by adding compound over the entire area which they occupy, and while the compound is very soft, insert the impression into the mouth and have the patient close tight on the bite block, instructing him to swallow two or three times. The tongue is automatically carried to the roof of the mouth during swallowing, and this action drives the soft compound into firm contact with the tissues overlying the posterior portion of the hard palate, and holds it there until it cools.

It may be necessary to add compound in the manner just described two or three times before the added compound blends smoothly with the rest of the palatal surface.

The impression is trimmed to the exact length desired in the finished plate, the posterior border of the impression warmed, placed in the mouth, and the patient again asked to swallow a few times.

The impression is now removed from the mouth and the buccal margins on each side over the tuberosities warmed deeply, using the side of a small flame so as not to distort its shape; quickly replace in the mouth, and have the patient close with a strong bite. This pressure properly muscle-trims the posterior part of the buccal margins to the movements of the muscles in this region. This trimming is very important, as it prevents a tendency to force the plate forward in biting.

The impression now, to all intents and purposes, is finished, and if the foregoing technique has been followed conscientiously, we should have a good one.

This is merely an outline of the principles that are necessary to be applied in the construction of dentures by which a patient will get efficiency never attained before by those who have been making them by the old method.

4510 Frankford ave.

[See also *Discussion*, as reported under "Proceedings of Societies," this issue.]

The Effect of Mouth Infections upon the General Health.

By R. W. BUNTING, D.D.S., Ann Arbor, Mich.

(Clinic given at the annual meeting of the Dental Society of the State of New York, held at Rochester, May 10 to 12, 1917.)

IN the presentation of this subject I recognize that there are in the audience at least three classes of practitioners: First, those who have heard of the possibility of mouth infection being a menace to the body as a whole, but do not believe that it is true; second, those who believe it is true but have been so overwhelmed by the possibilities and responsibilities of dental practice in the light of present knowledge that they are uncertain as to the proper procedure in practice; and third, those who have become over-enthusiastic and extreme in their attempt to meet the new situation. In the few minutes which I have to give to the subject I wish to address my remarks more especially to the second group, those conscientious and painstaking operators who are perplexed by the trend of dental literature and teaching regarding dental infections today.

Gentlemen, I shall ask you to turn back with me ten years in dental practice. You will remember that we were busily engaged repairing and replacing teeth as best we could by the then known methods. We little suspected that the work we were doing had any direct effect upon the general health of our patients. In a general way we knew that the proper function of the mouth in mastication was of benefit to the body as a whole, and some of us had a hazy idea that chronic abscesses and pus-laden pockets about pyorrhetic teeth might be injurious, but most of us gave very little thought to such possibilities. Little did we suspect that today we would be called to account for the things we did in dental practice, and be charged with the responsibility of many and sundry ailments in our patients in places far removed from the mouth.

It was in 1910 that the first real interest was raised in the significance of dental infection by the strong statements of Dr. Hunter, who said that it was the cause of septicemia and heart lesions. A few years later Rosenow found that many systemic conditions, such as affections of the nerves, heart, kidneys, muscles, joints, appendix, and gall-bladder, which had formerly been considered as disease entities, were the result of infection. These infections he found to be specific blood-borne streptococci, and these had an affinity for certain tissues when injected into animals, these tissues being in a large per cent. of cases the same as were affected in the original patient from which the culture was taken. He then sought to determine the avenue by which these infections entered the body, and their source. The portals of entry he found to be in injuries of various sorts, the natural openings of the body, and the sinuses. But of all of these the most common portals of entry proved to be through the tonsils, the nose and its accessory sinuses, and the mouth. In the mouth he found dental abscesses and pyorrhea, the prevailing organism of which was a streptococcus similar to that of certain lesions in the joints, muscles, etc., and these same organisms when injected in animals produced lesions similar to those of the patient from which they were taken.

These experimental studies of Rose-

now have been corroborated by a mass of clinical evidence from such men as Billings, Mayo, Moorehead, Hartzell, Price, and others, who have shown that many such cases give evidence of marked improvement when the oral foci have been cleared up and the primary infection eradicated—all of which has seemingly established beyond question the possibility of oral and tonsillar infections as direct causes of various systemic diseases. Later work has demonstrated the wide distribution of such systemic affections, and revealed an appalling prevalence of oral infections which may be harmful to the general health.

The result has been a widespread concern on the part of the dental profession as a whole in the significance of these findings as regards the proper procedure in everyday practice. Many conscientious operators have been appalled by the evidence at hand, and have been made to lose confidence in the safety of the operations which they have been making. Because of the possibility of infection they fear to devitalize a tooth, they fear the filling of a root-canal, they fear the treatment of an abscess, they fear the crowning of a tooth or the placing of a bridge, the treatment of pyorrhea, and sundry other operations which have been a matter of daily routine for years. They have lost confidence in themselves and their work, and are now seeking to know just what is safe and sane in dentistry.

Such an unsettled and perplexed state of mind is unfortunate unless it leads to a definite course of action which shall be an improvement upon the old ways and clear up the dilemma which now exists. It is therefore worth while to take stock of the things which we really know, and upon them build a procedure which is safe and sane.

In the first place we must recognize the fact that much that has been written and said upon the subject has been tinged with an over-enthusiasm, with the result that frequently a greatly exaggerated view has been given. If the reports obtained in investigations of free clinics and charity hospitals in the great cities were truly indicative of the condition of the average practice, we might expect that in the past ten years of practice at least fifty per cent. of our patients would be confined to hospitals or would have passed to the great beyond as the result of the dentistry which we have done for them. On the contrary, we have reason to believe that the dental service rendered by hundreds of careful and conscientious operators of the past has not resulted in the crop of direful and disastrous results which have been pictured. Not that we would minimize the significance or importance of dental infections, or the dangers of careless and slovenly dentistry, but we do not believe that any evidence has been shown which has discredited the work of the careful and painstaking operators who have given their best efforts to perfect their dental operations. Such men may have their failures, but their percentage of errors is far less than is depicted by the reports of indifferent and, we might say, criminal dentistry which have been presented as evidence of dental conditions as a whole.

PREVENTIVE DENTISTRY THE DENTIST'S SAFEGUARD.

Our duty as dentists lies in the prevention of infection entering the body through the tissues of the mouth. We find that many pathogenic organisms are common inhabitants of the oral fluids, but that they are kept from the circulation by the mucous membrane which lines the mouth. It is only by breaking down these barriers that infection may gain entrance to the mouth tissues, and thence to the circulation beneath. One vulnerable spot in the mucous membrane is to be found in the openings which are made in it by the eruption of the teeth, and which exist about each tooth as long as it remains in position. Normally, the soft tissues are held tightly about the teeth, but when by injury or irritation this relation is lost, access for infection to the deeper tissues is opened up. By progressive stages the process which we

know as pyorrhea severs the attachment of the tooth and surrounding tissues, producing a sheltered pocket in which organisms may grow and gain access directly to the circulation.

The second most vulnerable point in the mouth is that of teeth which have been attacked by caries; this destroys the pulp, which becomes infected with disease-producing organisms. The infection, after producing a putrefaction of the pulp, may then pass through the apical end of the root, to infect and destroy the tissues in that region by the formation of an abscess.

As these are the two most common and almost sole methods by which dental infection may enter the blood to be a menace to the body as a whole, we are chiefly concerned in pyorrhetic involvement and in devitalized teeth.

THE X-RAY AS AN AID IN DIAGNOSIS.

For information regarding the progress of peridental infections we have resorted to the use of the radiogram, without which a trustworthy diagnosis cannot be made. But many are making the error of using radiograms as an ultimate means of diagnosis rather than as one of several factors, which it really is. The practice of diagnosing a case from the radiogram alone is untrustworthy and dangerous. Take, for instance, the appearance in the film of a slight rarefaction or minutely abnormal condition at the apex of the root of a tooth. With our present knowledge no one is able to say in all cases whether this is an active infection or a latent one, a scar of an old injury, or *necrotic tissue*. In such a case our procedure should be guided largely by the general health of the patient. If there be no systemic affection and no direct evidence that the tooth is a menace to the individual it may be placed under surveillance, and not molested until such evidence is seen. But in case the patient gives evidence of systemic lesions of an infective nature which might possibly originate in the tooth under question, every effort should be made to clear up this and all other suspected foci in the mouth, even to the extraction of all such teeth.

Sanity and good judgment must control our diagnosis, rather than radical measures and empiricism. When a patient is referred by the physician as suffering from focal infection, no man can say at once that this infection has its origin in the mouth. Though there may be many abscesses and pyorrhea pockets in evidence, these may all be walled-off by granulations, and the poisonous effects of the infection confined, while an infected tonsil or antrum may be the real focus of the invader. But in any such case it is our duty to completely clear up all dental infection, by treatment, root resection, or extraction if necessary, until we may truthfully say that no focus of infection exists in the mouth. Then, and not until then, have we done our duty. If the patient recovers from his general symptoms we may infer that we have found the cause, but if he does not, search must be made in all of the other avenues by which infection may enter.

EFFORTS TO STANDARDIZE THE OPERATION OF ROOT-CANAL FILLING.

In regard to the filling of root-canals, very commendable advancement has been made in the past few years. Such men as Rhein, Callahan, Best, and Coolidge are seeking to reduce that operation to an exact science, and their teachings should be mastered by every practitioner. When this has been done, no conscientious operator need hesitate to devitalize a fully formed tooth whenever it is necessary to the performance of good dentistry. Such procedure when carefully done is much to be preferred to the overloading of vital pulps with irritating crowns and large inlay restorations which will ultimately cause their degeneration or death.

In pyorrhetic infections it is agreed that the deep and inclosed varieties are the ones to be feared. These are open to two methods of treatment other than extraction. By surgical planing and smoothing of the root the infection may

usually be removed and the tissues caused to heal about the tooth, or the pocket may be eradicated by splitting the gum tissues with a lancet, thus baring the root to the point of healthy attachment. In either case the infective process must be stopped or the tooth removed.

Although some of us may feel that the pendulum of dental opinion is swinging too far in the enthusiasm over dental infection, it still remains that when this pendulum shall come to rest, it will be at a point removed from that at which it rested ten years ago. It will be over on the side of thoughtful and earnest consideration of dental operations in the light of the knowledge which has been gained. He who shuts his eyes to these possibilities and the evidence which has been offered is deceiving himself, and will soon be pointed out as a menace to his community. We must all perfect ourselves in dental diagnosis in regard to infections; we must learn to fill root-canals, and to treat pyorrhea. When we have done this, we may practice dentistry with joy in our hearts, and with the firm conviction that we are doing a real service to mankind.

The Technique of Making Dental Radiographs.

By LEUMAN M. WAUGH, D.D.S., New York, N. Y.

(Clinic given at the annual meeting of the Dental Society of the State of New York, held at Rochester, May 10 to 12, 1917.)

IT will be my endeavor in the few minutes we shall have together to make clear to you that it is entirely feasible for any practitioner to do his own radiodontia right in his operating room, without seriously disturbing the average standard dental equipment. All that is necessary for us to have is an electric outlet, and the X-ray machine.

There are in the exhibit room several radiodontic outfits, any one of which I believe will give satisfactory service, and the selection may be governed by individual taste. For demonstrating I shall use the type with which I am most familiar, simply as a matter of convenience. Therefore I ask you to accept anything that I shall say as applying to radiodontia and radiodontic equipment in general, and not to any particular make or type of apparatus. Simplicity both of apparatus and technique will be our principal consideration.

First, I desire that we have firmly fixed in our minds that a radiographic negative is nothing more than a shadow, of which a permanent record is made. The only similarity to a photograph is that the shadow is recorded in the same chemic substance; in no other respect are they similar.

The light and dark areas in a radiographic negative correspond to similar areas of varying density in the structure radiographed. The zones of the structure that are dense resist the passage of the X-rays, producing a relatively light area in the negative, and conversely, the zones of the structure that are not dense permit the passage of the X-rays, resulting in a relatively dark area in the negative. Therefore a radiographic negative can show no more than the variation in the density of the structure, or of opaque substances, such as wires, etc., placed in the structure. A radiograph does not enlarge or magnify.

The technique may, for convenience of

description, be divided into four stages, which are, in the order of procedure—(1) Seating and position of patient. (2) Placing of the film and tube. (3) The exposure. (4) Development, fixing, washing, and drying. All these procedures, except placing the film and tube, can be done equally well, with a little instruction, by any average assistant. We shall now consider each stage in detail.

(1) *Seating and position.* The most convenient chair for making a dental radiographic exposure is the one in which the dental operation is being performed. If the rubber dam be in place it need not be removed, although opaque substances, as clamps, matrix retainers, separators, etc., that would cast a shadow in the field to be examined must be taken out. The presence of the dam does not materially lengthen the period of exposure.

(2) *Placing the film and tube.* This is the most important step and can best be done by the operator who is giving the treatment, because of his intimate knowledge of conditions and requirements. This step will take the most time for demonstration, therefore I shall take it up last.

(3) *The exposure.* This should be of definite length; counting is not usually of sufficient accuracy. A stop-watch, or better still, a timing-switch is most advisable, as either leaves the attention free to be centered on the patient.

(4) *Development.* The fingers need not enter the developer. A clip is placed near the edge and the film hung in a vertical position. Most uniform and satisfactory results are obtained by placing the film in the developer for a definite uniform time, a good working basis being five minutes, although this will vary according to the kind, the strength, and the temperature of the developer, and, what is very important, will depend on the length of exposure. It is best to have an accurate length of exposure and a definite period of development. If the negative comes out too light it will indicate that the exposure was too short, and if too dense, that the exposure was too long. The error can be corrected in developing the second film in the wrapper a longer or shorter time. In the next case the period of exposure can be corrected, so that a negative of proper density can be made in the standard length of time of development. After having been in the developer the desired time, the film is rinsed in water and placed in so-called "hypo" solution for twenty minutes or more, after which it is washed in cool, running water, for forty-five minutes or more, then removed and hung up to dry. This will take from one to two hours, and may be much hastened by placing in the breeze from a fan. A dark room is best. It need not have running water. Any light-tight closet large enough for one person will answer.

By making all factors definite and constant, any average assistant can do equally well all parts except the placing of tube and film, and no one can do this so well as the dentist treating the case, because of his knowledge of individual conditions and requirements.

[Dr. Waugh demonstrated the placing of the tube and film with the aid of a patient.]

576 Fifth ave.

The Influence of General Health on Oral Tissue.

By LEROY M. S. MINER, M.D., D.M.D., Boston, Mass.,
ASSISTANT PROFESSOR OF ORAL SURGERY, HARVARD UNIVERSITY.

(Read before the annual meeting of the Northeastern Dental Association, held at Worcester, Mass., September 26–28, 1917.)

THE need for the dentist of a broad training in the fundamentals of medicine, anatomy, physiology, pathology, and chemistry was never more apparent than it is today.

Although there may be persons who believe that general anatomy, including dissection of the extremities, has no place in the dental curriculum, and that physiology of the liver or the pathology of the gastro-intestinal tract has no practical bearing upon the practice of dentistry, yet, to those who have the interests of the dental profession at heart, and who wish to see it developed to its greatest efficiency, two facts must be evident:

First: A constantly increasing demand, many times by the physician himself, for diagnosis and treatment by the dentist of pathological conditions in the mouth which hitherto have been cared for by the physician.

Second: The need of a broader conception of the general field of medicine, if the dentist of tomorrow is going to meet his full responsibility.

The chief factor in bringing about this condition has been the theory of focal infection, and the important part played therein by the teeth. Medical and dental literature have been filled with articles on various phases of this theory. Extravagant claims of remote diseases caused by infected teeth have resulted in a reaction tending to discredit the whole subject. But the work of Goadby, Billings, and many other scientists of recognized standing, together with the mass of clinical evidence accumulating in the practice of almost every dentist, forces us to believe that the theory must have underlying truth. Hence it follows that dentistry is bound to become a field of broader opportunity than ever before.

However, my own opinion regarding the need of a broader training for dentists is not based solely upon the development of the theory of focal infection. For a long time I have been impressed with the sensitiveness of the oral tissue to changes in that equilibrium of the various structures of the body which we call health. In this paper I wish to present some results of observations made during the last few years which afford a viewpoint entirely opposite to that of infected teeth as factors in producing general disease. I believe that consideration of the influence of general health on oral tissue, as given herein, will furnish additional evidence of the need for a broader medical training in dentistry.

I make no pretense of presenting finished work. Rather am I impressed with the paucity of our knowledge. The general subject is practically untouched, and I feel that here is a fertile field open for research which some of our organizations could take up with advantage to us all.

SYSTEMIC DISTURBANCES REFLECTED IN THE MOUTH.

Here, then, is the fundamental truth underlying this paper: As the tissues of the mouth, both hard and soft, are extremely sensitive to changes in the gen-

eral health, therefore a healthy condition of the tissues of the mouth may be seriously impaired by disturbances in other parts of the body. In other words, while defective teeth undoubtedly may cause systemic disease under certain conditions, it is equally true that general disease may cause pathological conditions in the mouth.

This influence unquestionably begins at an early period in our life history. During infancy, disease or improper feeding, resulting in various degrees of malnutrition, will interfere with the normal development of both teeth and jaws. The pitted incisors and the decalcified first molars which develop during the first two years can usually be traced to one of these causes. Whooping-cough and condensed-milk feeding are in my own experience two conditions to which this type of defective teeth can very frequently be traced. And, of course, in congenital syphilis we have a classic example of injury to teeth due to general disease. In children who have had rickets, early loss of tooth structure is also frequently seen.

Such facts are not new, but their significance has not to my mind been fully appreciated. What more practical way to conserve preventive dentistry or prophylaxis than to place such facts on a scientific basis, amplifying by research the meager knowledge we have gained in clinical observation. In co-operation with other specialists in medicine, especially the pediatrician, the stomatologist has a rare opportunity for service.

INFANTILE SCURVY.

I. To discuss now the subject more concretely, first let me describe a rather common disease with which the dentist should be familiar. I refer to infantile scurvy, or Barlow's disease. Many times, particularly in mild cases, the chief symptoms are retrograde changes in the oral mucous membrane, and for this reason the dentist is consulted first. In this disease the oral mucous membrane is much congested, softened, and deep red in color, occasionally almost black; the gums bleed easily and show hypertrophy, sometimes covering parts of the teeth. In severe cases, the teeth may loosen and fall out. Frequently, a mild case is mistaken for either an acute stomatitis or an inflammation due to difficult dentition.

When such symptoms fail to respond promptly to local treatment, suspicion should be aroused, and search should be made for tenderness in the long bones, a periosteitis of varying degree being another rather constant symptom. Enlarged abdomen and pasty color are other suspicious symptoms. Proper treatment of the general condition will relieve the mouth symptoms without any local treatment.

Case. A baby ten months of age was seen with a marked inflammation and hypertrophy of the oral mucous membrane. The child had been perfectly well up to six months, but for a number of weeks had shown a gradually increasing soreness of the mouth which had made eating difficult. The little patient had been under treatment by a good dentist, but mouthwashes, cauterizing, and curetting all failed to give relief. This aroused my suspicions. A physical examination revealed extremely tender shin-bones, any pressure whatever causing pain. Careful questioning as to feeding soon established the probable diagnosis. Under the direction of a pediatrician a proper diet was prescribed, which included a liberal allowance of fruit juices. The mouth symptoms promptly disappeared without local treatment.

With adults, again, our fundamental truth holds good, that departure from normal in various organs of the body may be followed by retrograde changes in the mouth.

DISTURBANCES OF THE GASTRO-INTESTINAL TRACT.

II. In disturbances of the gastro-intestinal tract, aphthous stomatitis is occasionally seen which is stubborn in yielding to local treatment but which clears up under treatment of some general condition.

CANKER.

III. Canker is another condition observed in patients with high acidity in

the stomach or in a debilitated condition. We have little or no exact knowledge concerning canker. While it is not serious from a pathological standpoint, it is extremely distressing, especially in the recurrent type, and seems worthy of more attention, particularly as regards its etiology.

CONDITIONS SIMILAR TO PYORRHEA THE RESULT RATHER THAN THE CAUSE OF GASTRO-INTESTINAL DISORDERS.

IV. The fact that chronic low-grade inflammatory conditions of the mouth similar to pyorrhea alveolaris may be secondary symptoms of a disordered gastro-intestinal tract is also worthy of serious consideration. Two cases, briefly stated will illustrate my point.

Case 1. Woman, fifty-five years of age, for twenty years under treatment for pyorrhea by one of our best-known dentists. The teeth and gums were maintained in fairly healthy condition only by faithfulness on the part of both patient and dentist. If treatment were discontinued for any reason the teeth began to give trouble. The patient was not in good general health. A year or more ago she consulted a specialist in diseases of the gastro-intestinal tract, who found among other conditions a marked intestinal stasis. As her general condition improved, her dental symptoms improved likewise, and disappeared even with no specific dental treatment for a long period.

Case 2. Woman, thirty-five years of age, under observation for five years. Intermittent attacks of pain in the jaws, followed later by discharge of pus around necks of teeth, especially upper incisors; little or no pus between attacks, and no marked destruction of bone or recession of the gum during the period mentioned. These mouth symptoms appeared about the same time as acute attacks of indigestion to which she was subject. In fact, the patient could usually tell when an intestinal attack was coming because of the preceding pain in the teeth. After the intestinal symptoms appeared, pus around the teeth followed. Under general treatment these attacks have been so reduced in number that the patient now goes for months without trouble.

In this connection, the work of Percy Howe of Boston is significant. He has produced in laboratory animals by a constipating diet an inflammation of the mucous membrane of the mouth and loosening of the teeth practically identical with pyorrhea. Moreover, on the administration of a cathartic the mouth symptoms improve and soon disappear.

V. Another subject for investigation is suggested in the congested and inflamed gums seen so frequently in alcoholics. It seems quite reasonable to me that this inflammation, which frequently goes on to pus formation, is due primarily to a congestion of the liver and of the portal circulation rather than to local causes.

DIABETES.

VI. Again, diseases associated with the kidney, Bright's disease and diabetes in particular, frequently present their early symptoms in the mouth before the patient is conscious of anything else being wrong. In this fact lies a great opportunity as well as a great responsibility for the dentist, since early detection of a condition of this kind may save the life of the patient. Indeed, one or two writers on the subject of pyorrhea have recognized a diabetic form of the disease, as well as a form due to Bright's disease. A recent case illustrates the importance of such detection.

Case. A young woman of thirty years of age complained of severe pain which caused her wakeful nights. It appeared most frequently in the upper jaw on one side or the other, and sometimes in the lower jaw. Clinical examination of the mouth revealed nothing abnormal, and the X-ray revealed no pathological condition. The blood pressure was taken; it was over 200. Urine examination revealed a well-developed case of Bright's disease.

I have the greatest respect in the world for the local treatment of pyorrhea, and I have seen some wonderful results attained by specialists in this work; nevertheless, I do not feel we are doing our full duty unless we see to it that a complete physical examination is also made.

DISEASES OF THE BLOOD.

VII. Diseases of the blood may produce symptoms in the mouth. In a sec-

ondary anemia stomatitis may occur, while in the pernicious type I have seen cases with vague pain and tenderness that considerably interfered with eating. Splenic leukemia, while a comparatively rare disease, presents in the mouth very marked symptoms not unlike those of scurvy. The mucous membrane is soft and inflamed, bleeds easily, and may show marked hypertrophy. In one case this entirely obscured the teeth. Some of these cases might be mistaken for the soft type of epulis.

PREGNANCY.

VIII. Pregnancy, while not a disease, produces changes in the internal structure which in turn will induce retrograde changes in the mouth unless the latter receives proper attention.

RELATION OF THE DUCTLESS GLANDS TO MOUTH CONDITIONS.

IX. The ductless glands unquestionably play a most important part in their relation to a healthy mouth. One scientist has experimentally prevented the normal development of the teeth by removing the parathyroids.

Another authority on the ductless glands declares that "Deposits of tartar on the teeth in all forms of thyroid degeneration are common symptoms, these deposits being followed by retraction of the gum with loosening of the teeth, which are frequently lost." This is a physician's brief but accurate description of the sequence of symptoms in Riggs' disease.

X. In the cachexias from tuberculosis, cancer, and other chronic diseases, simple and acute ulcerative stomatitis are frequently seen.

There are also other general diseases which present mouth symptoms; of these, syphilis is of course a notable example. In this paper, however, emphasis has been placed on those special conditions in which the mouth symptoms may be an important factor, and which the dentist may be called upon to treat.

CONCLUSIONS.

Analysis of the facts already presented indicate, it seems to me—

(1) The intimate relation of the tissues of the mouth to the tissues of the rest of the body.

(2) The need of as broad a medical training for the dentist as for other specialists in medicine, the oculist or aurist for example, so that this relation may be better appreciated.

(3) The need of closer co-operation between dentist and physician.

(4) The need of definite research to amplify the meager knowledge we have of the subject with which this paper is concerned.

153 NEWBURY ST.

[See also *Discussion*, as reported under "Proceedings of Societies," this issue.]

Oral Anesthesia.

By HAROLD S. VAUGHAN, M.D., D.D.S., New York, N. Y.

(Clinic given at the annual meeting of the Dental Society of the State of New York, held at Rochester, May 10 to 12, 1917.)

IN considering briefly the advantages of local anesthesia we must not conclude that it entirely takes the place of general anesthesia, but it does fill a very large gap in oral surgery and exodontia between the cases where ether anesthesia and where nitrous oxid-oxygen anesthesia are indicated.

In the removal of impacted teeth where a moderate amount of bone excision is necessary conductive anesthesia with novocain-suprarenin is the method of choice. The operator can proceed carefully but surely, and as a result a clean, non-mutilated wound is left, in which healing is more rapid and after-pain lessened.

For the surgery of infected foci, granulomata, small cysts, fibrous growths, and root-end resections as done in the office, local anesthesia is essential for careful work.

In exodontia for hypercementosed roots, and roots that have been broken off below the alveolar border, by the careful use of elevators and chisel gouges under local anesthesia those operations can be performed with the minimum amount of surgical trauma.

Local anesthesia is also indicated in the extraction of teeth with divergent and curved roots where great care is necessary to prevent fracture or damage to the surrounding tissue.

Local anesthesia is indicated in general dentistry for cavity preparation in the type of patient whose dread of dental pain makes thorough work almost impossible. Conductive and infiltration anesthesia has made this work easier for both patient and operator, as well as in pulpitis where pressure anesthesia is contra-indicated. In crown and bridge work, local anesthesia makes possible the proper preparation for crowns and inlay abutments, or makes pulp extirpation easy where it is indicated.

Conductive and infiltration anesthesia also has its advantages and indications in patients with heart and kidney lesions who cannot take a general anesthestic, also where nitrous oxid is contra-indicated, in arterio-sclerosis with high blood pressure.

We divide local anesthesia into conductive anesthesia, or nerve-blocking, in which the object is to infiltrate the anesthetic around a larger nerve at a point central to the operative field, and thus block the nerve of power to carry sensation therefrom: and infiltration anesthesia where the operative field is thoroughly infiltrated with the anesthetic solution, thus affecting directly the terminal nerve filaments.

TECHNIQUE FOR MANDIBULAR ANESTHESIA.

With the index finger of the left hand the anterior border of the ascending ramus is palpated, first locating the sharp external border, then the internal border, which serves as a guide for the insertion of the needle. The needle is inserted at a point about 1 cm. above the line of the last molar, the syringe being directed obliquely on a line with the first bicuspid of the opposite side. The needle is then carried in closely in contact with

the internal surface of the ascending ramus to a depth of about 2 cm., and 2 cc. of a 1 per cent. novocain solution is injected, producing anesthesia to the median line by blocking the inferior dental nerve where it enters the inferior dental foramen.

TUBEROSITY ANESTHESIA.

With the index finger of the left hand palpate the malar process of the superior maxillary bone, and insert the needle opposite the second molar at the gingivo-labial fold. The needle is carried upward, backward, and inward to a depth of 2 cm. in contact with the zygomatic surface of the maxilla, about 2 cc. of the solution being necessary for an injection. The nerves supplying the molars and bicuspids are thus blocked off.

Infra-orbital anesthesia is used to block off the incisors and canine. With the index finger of the left hand the cheek is retracted, exposing the canine fossa. With the thumb the inner third of the margin of the orbit is palpated, the needle is inserted in the canine fossa and is directed upward to the region of the infra-orbital foramen, to which it is guided by the thumb, and about 1.5 cc. of the solution injected.

INFILTRATION ANESTHESIA.

In producing infiltration anesthesia around the teeth the needle is inserted about 0.5 cm. beyond the gingival border. The opening of the needle should face the bone, the solution being deposited under the periosteum. Injection should be made both labially and lingually.

CONTRA-INDICATIONS FOR LOCAL ANESTHESIA.

Local anesthesia is contra-indicated in cases of cellulitis, acute purulent osteitis and periosteitis, and in excited, hysterical, and neurasthenic patients where the thought of consciousness during operation produces psychic shock. Conductive and infiltration anesthesia is not indicated in more than a fair percentage of cavity preparations. It should not take the place entirely of sharp, well-cutting instruments and of judgment and care in the selection of the least sensitive portions of the cavity for retention.

It is understood that the field of injection and instruments should be sterile, and the solution non-irritating. Tissues should not be unduly distended or stripped from the bone. Even under a careful technique the injection of foreign material into the tissues may give rise to considerable after-pain.

A mandibular injection may at times give rise to considerable after-pain and soreness, difficulty in swallowing, trismus, or fixation of the internal pterygoid muscle. For these reasons it should not be employed indiscriminately or carelessly.

616 MADISON AVE.

Practical Sterilization for the Dentist.

By LOUIS MEISBURGER, D.D.S., Buffalo, N. Y.

(Clinic given at the annual meeting of the Dental Society of the State of New York, held at Rochester, May 10–12, 1917.)

BY "sterilization" is meant the destruction or removal of all micro-organisms in or on a body or substance. Disinfection has a somewhat analogous signification, but denotes the destruction or removal of infectious microbes, and this may or may not be accomplished without complete sterilization, according to the nature of the particular case in hand.

Antisepsis means the inhibition of the growth of micro-organisms without necessarily killing or removing them, and is especially applied to the checking of microbic activity in wounds and the effects produced thereby (sepsis).

Food preservation involves similar principles, depending upon the prevention of microbic activity in dead organic matter either by sterilization or by the presence of inhibitive substances similiar to antiseptics, but in this instance called preservatives.

According to an article which appeared in a recent issue of the *Bulletin* of the U. S. Health Service the sterilization of dental instruments can be accomplished by immersion in phenol for from fifteen to forty-five minutes, 5 per cent. solution being more efficient than pure phenol. As we cannot stop to examine the instruments every fifteen minutes, the outside limit must be accepted.

The most expeditious and reliable method of sterilizing root-canal instruments is without doubt by heat. According to Hasseltine, author of the article above referred to, immersion for three minutes in boiling water or water at the temperature of 80° C. will kill all but the most resistant spores. Inasmuch as we are not especially concerned with spore-bearing bacteria, but more particularly with the staphylococcus and streptococcus, three minutes of boiling is all that is needed, and anything beyond that may be considered a margin of safety.

An evaporating dish or a similar vessel over a burner on the bracket table or near by enables the operator to use with safety the same broaches over and over again in the same operation. New broaches are not always sterile, because a broach once sterile does not necessarily remain so.

Instruments may be scrubbed with a stiff brush immersed in tincture of green soap and alcohol to remove débris, then placed as above in boiling water, or water at 80° C. Soap (green soap) has a slight germicidal value, which in conjunction with its solvent action on fats and protein and the mechanical cleansing which accompanies its use, justifies assigning it an important place among the chemical disinfectants.

In cases of specific infection, boiling instruments for fifteen minutes is recommended. Sodium bicarbonate or borax should be added to the water to prevent rusting. Calcium chlorid will prevent to a marked degree tarnishing or rusting of instruments, if placed in the cabinet in a glass container without top. It is highly deliquescent, and readily absorbs moisture from the air, and should be replenished every few days.

Steam at 250° F. will kill all spore-bearing germs. The standard method adopted in hospitals for the most refined surgical work is to boil instruments, entirely immersed in the water, for a

period of fifteen minutes or longer, the instruments being thoroughly washed previous to sterilization.

We have here [indicating one of the sterilizers used in the clinic] a sterilizer with which we may sterilize all our instruments, including rubber dam, paper points, gauze, etc., with fifteen pounds steam, corresponding to 250° F., maintained for twenty minutes or longer. This is what hospitals are doing. There is practically no moisture, and the instruments are dry enough when taken out for immediate use.

As to proof of sterility: Dr. A. W. Diack of Detroit, a chemist, uses a tiny closed capsule in which he places a pellet of some chemical composition, which when subjected to fifteen pounds of steam pressure for a few minutes will melt. This pellet is useful in determining whether or not the operator is following instructions. If the pellet has not melted the process has not been carried out in accordance with instructions.

Gutta-percha cones should be immersed in alcohol. The fingers should be dipped in alcohol or Hogue's preparation of campho-phénique when placing cotton on canal-dressing instruments.

The hypodermic syringe should be kept in a solution of alcohol 2 parts, glycerin 1 part, and the needles placed in a container of alcohol and glycerin as above. Forceps, etc., should be dipped in alcohol and held over the flame before using, as well as having been sterilized. When gauze is sterilized do not have it rolled too tightly.

85 N. Pearl st.

Correspondence

"Septic Teeth: Their Etiology and Surgical Treatment."

To the Editor of the Dental Cosmos:

Sir,—May I ask for a little space in the Cosmos to suggest a point of view slightly at variance with that of the reviewer of Dr. Josef Novitzky's paper, "Septic Teeth: Their Etiology and Surgical Treatment"?

In the December issue it is asserted that "The larger part of Novitzky's paper is occupied by generalities which are neither particularly new nor interesting to the dental profession. However, this condition is perhaps explicable when we learn that this paper was prepared for a medical and not a dental audience."

I believe that the men of the dental profession on the Pacific Coast, at least, have found a good deal that is distinctly new in Dr. Novitzky's paper, and whether they agree with him entirely or not, they have been very much interested. Moreover, the recent publication in several eastern magazines of articles along the same line would seem to indicate that other sections of the country are finding interest in the suggestions as to the proper removal of septic teeth. Witness the similar article in the December Cosmos.

May I inquire if the reference to "a medical and not a dental audience" implies that a dental audience would not be interested in septic teeth? Let us hope not.

In one respect I agree thoroughly with the reviewer, "Dr. Novitzky is distinctly an enthusiast," be it said to the honor of his profession. His years of study, experimentation, and surgical experience certainly indicate an idealism that should be encouraged, particularly in the dental profession.

Yours truly,

Robt. Burns, Jr.

San Francisco, Cal.

PROCEEDINGS OF SOCIETIES

Northeastern Dental Association.

Twenty-third Annual Convention, at Worcester, Mass., September 26, 27, and 28, 1917.

(Continued from page 158.)

WEDNESDAY—*Afternoon Session.*
(Continued.)

The next paper presented was one by Dr. LEROY M. S. MINER, Boston, Mass., entitled "The Influence of General Health on Oral Tissue."

[This paper is printed in full at page 234 of the present issue of the DENTAL COSMOS.]

DISCUSSION.

The President. It were too bad if nothing should be said on a paper of this sort, which touches so vitally the matter of our everyday work, and touches so vitally also on the thing that we have been seeking to bring about, that is, a proper recognition by medical men of the dental profession. If we are to have proper recognition, it must be because we are able to render to the patients of the medical men a service they are not able to render, and one for which they must look to us. We hope to have such co-operation from the medical men as we may deserve by our fitness, and to render a service that will bring about such co-operation. There are conditions in the mouth that are obscure and for which we are at a loss to find a cause, and must refer to physicians, just as in the experience of physicians there are conditions for which they cannot find a cause and which they refer to us. When we are able to find the cause and remove it, and render service in that way, we shall have co-operation from the medical profession. There are cases too obscure for either the medical man or the dentist alone to find the cause, and the paper emphasizes the point that in these mouth cases such as have been spoken of, and which do not respond readily to treatment, if we fail to bring a medical man into the case we fail to render to the patient the service that we are expected to render; just as the medical man would fail if, in certain cases where it is beyond his power to find the cause, he failed to bring the dentist into the case. Those are the cases in which co-operation is necessary in order that we may render to the patient the service that both the medical and the dental profession are expected to render, and through which the professions will be brought more closely together.

Dr. W. R. Pond, Rutland, Vt. In reference to what Dr. Miner said about infantile scurvy: One of my children, three years of age, had a very distressing condition of the mouth, and we were unable to account for it. The physician said that if the child were not in a family of plenty, he would think that she had scurvy. Anyway, the mouth condition cleared up under general treatment and a change of diet, and, as I have thought it over since, I believe it was undoubtedly something of the nature of scurvy. It was plainly a case of wrong diet and the mouth conditions were indicative.

Dr. Miner (closing the discussion). There are two or three points I wish to emphasize, but first I would say that I feel it a privilege to have been in the general practice of dentistry. I believe any specialist should be in the general practice of the profession in which he intends later to specialize.

I realize that ninety per cent. and perhaps more of the dental profession do reparative work and mechanical work connected with restoring teeth that have been lost, but I can see no reason why a dentist who does this work should not have a broad medical training which will better enable him to treat pathological conditions in the mouth, just as an oculist, while he may principally do refraction work, which is a mechanical procedure, must know how to treat the diseased eye. It is a source of gratification to the dentist and to his patients to know that his training makes him more keen and more capable of handling the occasional case that is out of the ordinary. Of course, a specialist sees a larger number of cases of this kind, and his viewpoint is likely, therefore, to be warped, making him feel that these cases are more common than they really are, and that the particular work that he is doing is more important than the general practitioner believes. Nevertheless, I feel that cases of the kind referred to in my paper occur, perhaps, more than occasionally, and are often overlooked. Dr. Pond's remarks illustrate this.

Scurvy is a misunderstood disease. It is not a matter of not being able to get the proper food; it is a question of improper feeding. It is not a disease that occurs always in poor families, but is liable to occur in any family, no matter how well-circumstanced they are, with ability to furnish whatever is necessary in the way of food to their children. These cases almost always occur in families that are able to provide the right kind of food; it is simply because of the fact that they have been misled as to the kind of food that should be given. The milk diet has been continued too long, and the child has not obtained the necessary bone-building materials, which are supposed to have an influence in keeping away scurvy. Fruit juices are almost a specific in the treatment of the disease.

Dr. Pond. May I interrupt for a minute? The child I spoke of afterward developed appendicitis, was operated on and nearly died, as it was a pus case. She had been ailing for months, and had shown various symptoms, but nothing that would indicate appendicitis.

Dr. Miner. That is extremely interesting, because it adds another point to the truth I am trying to illustrate.

Dr. Manson's suggestion interested me, also. If the medical profession is going to recognize dentistry as a branch of medicine, we must show ourselves worthy. We must show that we do read and are interested in something besides the mechanical restorative work, as Dr. Ruyl has shown so clearly this afternoon. I enjoyed his paper thoroughly. Dentistry is a pretty broad field of work, and properly, to my mind, is a specialty of medicine. If we are to get co-operation between the medical and dental professions, we must show that we are qualified to meet the physician on his own ground. We must show that we appreciate some of his problems and the conditions that he has to consider. It is this that we are looking for, of course; and attainment depends on various things. It depends on the attitude of the profession and that of the faculties of our dental schools, who should recognize this fact and increase the requirements for our dental students. Until that time comes, we cannot hope to stand on a plane with the other specialists of medicine.

Adjourned until the evening session.

WEDNESDAY—*Evening Session.*

The meeting was called to order by the President at 8.25 P.M.

The Secretary read a telegram of greeting from the president of the National Dental Association. The President stated that he had also received a letter from the same source, but had failed to bring it with him to the meeting.

Dr. R. Ottolenghi of New York City gave an extemporaneous lecture on the subject of "The Physical Effects of Ionization upon Diseased Apical Tissues," which was discussed by Drs. Leroy M. S. Miner, Boston, and A. J. Asch, New York.

Adjourned until Thursday afternoon.

Thursday—*Afternoon Session.*

The meeting was called to order by the President at 3 P.M.

WELCOME FROM THE MAYOR.

The President then introduced Hon. P. G. Holmes, mayor of Worcester, who welcomed the society to Worcester as follows:

Hon. P. G. Holmes. *Mr. President, members and friends of the Northeastern Dental Association,*—I fully realize that you have a very full program outlined for this afternoon, and know you will all be very glad if I make my little say brief. I can assure you, however, that I am glad to come here just to say a few words to you on this occasion, as I want to extend to you the warm greeting and warm welcome of the city of Worcester. We enjoy your meeting, and can assure you that we shall look forward with pleasure to your coming again, and having convention after convention here. If our local organization is not taking care of you properly, we will find out the reason and remedy it. I believe you are in the hands of men who understand their position, men who will take care of all your little wants while you are here, and if they do not, I believe that it is your duty to report that matter to me or some member of the committee, because we want you to feel at home, and we want you to come again. We take a great deal of pride in Worcester, and we want you to take a little of that pride with you when you leave after your convention is over. I can assure you that whenever you come here, either as a convention or as individuals, Worcester will always welcome you and be ready to take care of you in the right way.

A motion picture showing "Extraction of Teeth under Nitrous Oxid Anesthesia" by Dr. J. D. Thomas was then exhibited.

Dr. Manson introduced Dr. W. D. Tracy of New York, who made an appeal to the members of the association in behalf of the Preparedness League of American Dentists, asking their aid in improving the dental condition of the men in the army.

Lieutenant Heckard of New York was introduced, and spoke on the Preparedness League's work in the army.

A motion picture, showing the "Extraction of shrapnel from the face and jaw, implanted there as the result of war injuries," was exhibited by the S. S. White Dental Mfg. Co.

The Secretary read a telegram from the sister-in-law of Dr. Saunders, the former treasurer, stating that she had just heard of his safe arrival in France.

The meeting then adjourned until the evening session.

Thursday—*Evening Session.*

The meeting was called to order by the president at 8.15 P.M.

A motion picture showing his method of oral prophylactic Treatment of Pyorrhea was exhibited by Dr. Paul H. Stillman of New York.

A paper was presented by Dr. K. H. Thoma, Boston, Mass., entitled "Selection of Anesthesia for Oral Surgical Operations, and the Roentgen Ray as an Aid in Diagnosis."

[This paper is printed in full at page 209 of the present issue of the Cosmos.]

DISCUSSION.

Dr. Leroy M. S. Miner, Boston, Mass. I wish to refer briefly to one point, and that is, the use of local anesthesia in connection with general anesthesia. Dr. Crile of Cleveland, a man of great ability as a surgeon, and greater as a research worker, brought this matter to our attention. It has long been known

that although a patient may be unconscious during an operation, he may, even after a very slight one, experience a tremendous shock, this being known as "surgical shock." Dr. Crile undertook to find out what surgical shock is, and, briefly, he found it to be this:

Although the patient may be unconscious and suffer no actual pain, the traumatism is registered as an injury in the nerve cells, and the result is as serious as though pain had actually been felt. To avoid this, we use a method of nerve-blocking by means of local anesthesia to prevent these sensations from being conducted to the brain. That is a point that many surgeons have seriously taken into consideration, and consequently they are habitually using local anesthesia in connection with general anesthesia.

Dr. Wm. H. Weston, Nashua, N. H. I want to ask a question. Before the injection of the anesthetic, Dr. Thoma has told us, he sterilizes the gum with iodin, which is the method employed generally, I believe. Just recently, in talking with a surgeon in central Massachusetts, a man well instructed in all lines of surgery, I mentioned sterilizing the gum with iodin previous to using novocain, and he brought out the point that it is recognized by the medical profession today that the application of iodin to a moist surface has very little sterilizing action; they like to have the parts to which the iodin is to be applied shaved from twelve to twenty-four hours previous to the operation. In the case of the injuries received in many large factories, those in charge are instructed to apply the iodin with the parts dry, and before washing. Now, could we use anything better than iodin? Would clear alcohol be better?

Dr. Thoma (closing the discussion). Just a word with regard to the use of iodin and alcohol. Iodin is an alcoholic solution. The effect you would get from the alcohol you get from the alcohol that is in the iodin. I dry the surface of the gum as well as possible before applying the drug, in that way getting some action of the iodin. At least, that is clinically evident from the fact that I get no infection when doing these operations in the mouth.

The hour is very late, and in order to give the next essayist an opportunity to present his essay I shall close the discussion. I wish to thank the gentlemen of the Northeastern Dental Association for the interest they have taken in my paper.

Report of the Nominating Committee.

The report of the Nominating Committee was presented by its chairman, Dr. Barrett, as follows:

Mr. President and members of the society, —The Committee on Nominations begs leave to submit the following recommendations:

President—Dr. Ira B. Stilson, Providence, R. I.

First Vice-president—Dr. William R. Pond, Rutland, Vt.

Second Vice-president—Dr. Blake A. Sears, Hartford, Conn.

Secretary—Dr. Alvin A. Hunt, Hartford.

Assistant Secretary—Dr. Leslie A. Spelman, Hartford.

Treasurer—Dr. Roy A. Bush, Worcester, Mass.

Librarian—Dr. William A. Young, Concord, N. H.

Thomas J. Barrett, *Chairman.*
William R. Pond,
Albert E. Cary,
Joseph E. Farnum,
C. Frank Bliven, *Committee.*

Dr. Barrett. I beg leave to amend the report, if there is no objection, by adding the name of Dr. Irving E. Pendleton of Lewistown, Me., for editor. The committee overlooked that office. This is a unanimous report of the committee; and as the hour is late, I would move that the secretary be instructed to cast the ballot of the society for the gentlemen nominated by the committee, except the person nominated for secretary, and that the president cast the ballot for that officer. (Motion carried.)

The ballots were cast for the list of nominations as read by the president.

The President announced as the next item on the program a paper by Dr.

Norman B. Nesbett, Boston, Mass., entitled "A Simple Form of Removable Bridge Work with Cast Clasps."

[This paper is printed in full at page 204 of the present issue of the Cosmos.]

DISCUSSION.

Dr. I. B. Stilson, Providence, R. I. Probably the most serious objection to this class of work is the subsequent decay of the enamel under the clasp. I believe, however, that this can be entirely overcome. I see no reason why a tooth should decay more readily where it is in contact with a clasp than when it touches a neighboring tooth. It is a matter that rests entirely with the patients as to whether they are going to keep their teeth in a sound, healthy condition or allow them to decay. There is something interesting to me in the case shown in the slide, in which two molars had been lost and the bridge placed from the second bicuspid to the third molar. I can testify to the comfort and durability of a clasp of that kind, as I am wearing one of Dr. Nesbett's bridges, and it is giving entire satisfaction.

Dr. Nesbett (closing the discussion). I have not very much to say, except to agree with Dr. Stilson. If we admit that we are going to have decayed teeth, we are going to have them; that used to be the attitude of the dental profession toward the public. It is a question of prophylaxis; if we are not careful of the enamel surface, we will get decay. I have seen it, and they say that this type of clasp causes it; but I do not expect to have decay, nor does Dr. Stilson, ten years hence. There are disadvantages in every kind of work devised; you cannot get perfection in any one way. I think the feature of decay is a minor consideration.

A moving-picture film showing the operation of Bone-grafting, as performed by Dr. Fred H. Albee of New York City, was exhibited.

The meeting then adjourned until the Friday morning session.

Friday—*Morning Session.*

The meeting was called to order by the president at 10 a.m.

The Secretary read the report of the Committee on the President's Address.

On motion of Dr. Stilson, the report was accepted.

On motion of Dr. Edward S. Rosenbluth of Bridgeport, Conn., the president was directed to appoint a committee of five to formulate plans for the carrying out of the recommendations of the committee that had just reported. Dr. Manson stated that he would appoint that committee at the close of the meeting.

On motion of Dr. Stilson, the society decided to remit the dues of all its members who are serving in the United States army during the time that they remain in service.

The President then introduced Dr. Herbert L. Wheeler of New York City, lieutenant in the Dental Reserve corps, who read a paper entitled "The Relation of the Surgeon and the Dentist in Face and Jaw Injuries."

[This paper is printed in full at page 220 of the present issue of the Cosmos.]

DISCUSSION.

Dr. Thomas J. Barrett, Worcester, Mass. What Dr. Wheeler says with reference to the lack of knowledge on the part of the average dentist who has applied for admission to the Dental Reserve corps is absolutely true, and recent examinations have clinched the facts as he states them. His paper is an arraignment of the dental profession for their lack of knowledge along certain lines. I do not believe that this is the result entirely of college training and poor teaching. I think that is true to some extent, but it is due to other causes as well.

As I understand Dr. Wheeler, he desires to call the attention of the profession to our lack of preparedness with reference to meeting and treating the

conditions with which we are soon to be confronted. How much this lack of preparedness to meet the present crisis may be chargeable directly to the dentist, and how much to our national deficiencies in not preparing men for this line of work, I am not ready to say.

How many men practicing in this city have had opportunity to treat fracture cases? How many, when they did have such an opportunity, have availed themselves of it, and how many have sought for an opportunity? The larger number would be those who have avoided them. How many of the schools have taught and insisted upon the treatment of fracture cases by dental students? How many have sent their students to hospitals and infirmaries where they would have a chance to meet and treat these cases? You see, the responsibility is not all on one side, it is divided. How many practitioners of dentistry have ever seen a gunshot wound?

I have been connected with one of the hospitals in Worcester for many years, have treated fracture cases, and have always had more or less difficulty in getting men willing to assist, and to devote their time and energy to treating these cases. There is no money reward in treating fracture cases. Of the many I have attended, I have been paid for very few; of the few, it has been some corporation by whom the man was employed that paid my fee—rarely ever the patient. It is not an inviting field for dentists to work in from a remunerative point of view.

What Dr. Wheeler is trying to convey is that there is now urgent need for men to come forward who have had special training in oral surgery and fracture cases. The Government is amply supplied with dentists to do repair work on the teeth of soldiers. Twenty-eight hundred have been commissioned, and that is the number allowed by law for the 2,800,000 men who are to be enlisted; but there is urgent need for men who have had some surgical experience, and who can do the work that Dr. Wheeler says will soon be forced upon us, and which will demand our skilful attention. I understand that the Surgeon-general is now creating what are to be known as *head* units, where men of experience in oral surgery will work with the general and plastic surgeons as well as with the nose-and-throat men and the eye-and-ear men. These various specialists will work in harmony to put the injured men back into society in a healthy as well as a sightly condition. I do not know how we are to meet that demand now, but I do think that the profession will fully meet it. When called upon, I believe we shall have a sufficient number of men of ability to come forward and meet the responsibilities, and show that in the dental profession we have men who will measure up with any other medical specialists. This can and will be done by the dentists of this country as well as by those of any other country now engaged in this terrible conflict. Our men are as well equipped and better trained than any dentists in the world.

It is a terrible reflection on the dental profession, but I know it to be true, that we have some men who are now seeking commissions who are without ability to diagnose the simplest oral condition, and who do not know the blood and nerve supply of the teeth. Dr. Wheeler's examinations have revealed this fact, and other examiners doubtless will confirm his findings. It behooves us to prepare for this demand, and to prepare quickly. The young men going into the work should spend every leisure moment in preparing themselves for the call that will be made upon them. I think we owe Dr. Wheeler a debt of gratitude, for it is not every man who would take the bull by the horns and present the conditions as he has found them. It is not a pleasant thing to do, but he has pointed out our weak spots, and told us how we can overcome them, and how we can prepare ourselves to meet the conditions that will confront us.

I have been asked to take up another phase of the subject. There are a number of men in the profession, who, loyally responding to the call of duty, have received commissions as lieutenants in the dental corps, have closed their offices,

have turned over their practices to others, and have done everything they could to prepare for duty. It seems that the Government has at present all the operating dentists needed, and many of the men commissioned have no assignments. These men are much disturbed over present conditions as well as the future. There is no demand for them now, and only those who can specialize will be called or accepted. If Dr. Wheeler could tell these young men what their status is and what their future is likely to be, it would be of value not only to those here, but to many others in similar positions.

Dr. M. E. Pierce, Cambridge, Mass. What proportion of those who present themselves for examination as dentists succeed in passing the examination?

Dr. Wheeler (closing the discussion). I shall close the discussion on the paper first, and then answer the questions of Dr. Barrett and Dr. Pierce.

I am glad Dr. Barrett brought up the question he did, because there is much confusion in the minds of the profession and the public, and especially of the exemption boards, with regard to this subject. My paper was not written as an arraignment of the profession. As a teacher, it is my custom to get down and have heart-to-heart talks with my classes when I think they are not doing well, to point out to them where they are lacking, and endeavor to get them to overcome the deficiency. My thought was that we are confronted with the greatest conflict that the world has ever seen. I think very few men in this country appreciate the gigantic nature of this war. I scarcely appreciate it myself, although I have been twice in Europe and twice in England since war was declared. I have seen the troops of Belgium, France, England, and America marching into this war. I have seen the wounded from the western front in large numbers, in France and in England; I have seen the German prisoners in their pens, and in the Val de Grâce Hospital the wounded Germans, and the scale on which this conflict is being waged is something almost beyond human comprehension. I think I could almost say, without being brutal, that the man who is killed is often more fortunate than the man who survives.

Now there will be in this country, as there are already in France, in England, in Belgium, and in Italy, a very large number of men with severe wounds about the head and face. Trench warfare, as you know, lends itself particularly to that type of wound, and while I do not think the proportion is so great now as in the beginning, or so great as has been claimed, it is still sufficiently great to be appalling. When these men begin to come back here, the dental profession must be in a position to work harmoniously with all possible forces to alleviate these conditions, and the object of my paper was to persuade all men who feel that they are in the least bit capable of such work, who have an interest in it, and who would like to be of assistance in caring for these mutilated men, to prepare themselves.

It is not strange—Dr. Barrett has given you the reason why it is not strange—that so few dentists do this work. His statement as to the number of fractures in persons able to pay for treatment coincides exactly with my own experience. As the director of the service at Bellevue and allied hospitals, I have occasion to see two hundred or more jaw cases annually; and in the seventeen years that I have been in New York I have never had but three cases that could pay anything—and one of these jumped his bill and disappeared; the others were automobile accidents occurring in people who had means. Nevertheless, it is essential that the dental profession learn to do this work.

Now, to digress a moment, those of you who know of my activities in regard to getting men interested in working for the departments of Health and Schools know that I have never advocated dentists' giving their time or doing work for the Health department or the school boards in New York without compensation. I believe that a professional man who works for the public is worthy of his hire, and the only excuse for dentists' doing this work for the public gratis is

for educational purposes. When that is done, the public should do just what they did in the case of the medical profession. They should appoint dentists to the proper offices, and pay them, as they do physicians. That was done in the New York Health department when I was in position to exert some influence on the question. Physicians and surgeons, however, do give a great deal of their time gratis in hospitals, and there they see these charitable cases. Dentists could do the same thing, giving their services to the hospitals for a certain amount of time. The dentist cannot give so much time as the physician, because his work is of a different nature. We not only diagnose and prescribe in the case, but we also perform the operation and fill the prescription. Furthermore, we are working on organs that, up to a short time ago, have not been considered of very great importance—and for that matter, are not yet considered of much value.

What I urge, then, upon the members of the profession is, so far as possible, to associate themselves with hospitals and with men who have had experience in this line, and get experience. Go back to your books, and study the anatomy of the parts. Go back to your histology and your pathology, and understand, as far as you may, the necessities of the case, and put yourselves in such a position that when you are called upon, as you will be if this war is not over soon and Germany is not whipped, you can meet the demand. We hope that this will be the end of it. Germany claims that she can, in case of necessity, continue the war for many years, but her prognosis has usually been wrong. It is almost a certainty at present that if the Allies keep up their work and hold on, Germany will not only be defeated, but will be crushed—and she *must* be crushed. But before that is done we are going to know what war means in this country, and we are going to know what it means to have acquaintances return with these conditions of mutilation.

My paper was written in an attempt to appeal to the members of the profession which I have, to the best of my ability, in my weak way and with many mistakes, served for a good many years, and I think those who know me know that when I say a thing to the members of the profession that appears to be harsh, it is because I feel they need it. I say it in all friendship, not as destructive criticism. Therefore I hope you will take this paper in the way I have intended it, and will not only prepare yourselves for the work that I know is coming, but urge your acquaintances to do the same thing. If you do, you will not only be of great value to your fellow citizens and to your country, but you will be doing a great deal for dentistry.

Regarding men commissioned in the Dental Reserve corps, I should like to give a word of advice to those who have rushed into uniform after receiving a commission, and before being assigned to active duty. There have been, up to the present time, fully 2800 dental men who have accepted commissions, and fully 3700 to whom commissions have been tendered, and who can obtain them by taking the oath and accepting the commission. There are only 1200 dentists needed at present at the various cantonments. There are not enough equipments for 500, but this is being rapidly remedied. The Government is doing all it can. If you are commissioned and not assigned to active duty, stay right at your work. Do not run around and assume that you are in the service of the United States Government, for you will not draw one cent of pay until you receive three of those printed notices from the Adjutant-general's office, with the seal of the Government on them—one of which you retain, and two of which you send to the chief quartermaster. When that is accompanied by an attested statement as to the time when you entered the service, you begin to draw pay, and not before. Many men who have received commissions will not be called, because the army is not large enough at the present time to require them, and it will not be, unless an entirely new draft is called for. With comparatively few exceptions, the younger men, recently graduated, are

not likely to be called. Therefore the young men who have been out of school only one or two years and who have positions, or who have practices, should continue their work as though they had not received commissions.

Dr. Louis L. Beach, Bristol, Conn. Will Dr. Wheeler tell us the dental requirements for the drafted men?

Dr. Wheeler. They are relatively simple. The only thing required is that the man have two double teeth above, and two below, which occlude. These may be bicuspids or molars. The number required in the navy is higher; there must be twenty teeth. It should be recommended to the Government that dentists be consulted in each recruiting center, as to whether or not the mouth is in a healthy condition. It has been found that the condition of the man is a question of nutrition, his capacity to take care of the food received. In some cases, men with no teeth have done finely and those with many teeth have had to be sent back home because they could not stand the strain. It is a question of vital resistance. The dentist should understand these things, and should be where he can be consulted. Until that is done, the Government will lose the services of a good many men that it should have, and will enlist a good many men who will be burdens to the army, and will have to be sent back home.

(To be continued.)

Academy of Stomatology of Philadelphia.

Regular Monthly Meeting, held November 27, 1917.

THE regular monthly meeting of the Academy of Stomatology was called to order by the vice-president, Dr. Jaquette, at 8 P.M., on Tuesday, November 27, 1917.

The Secretary read the minutes of the preceding meeting, which were approved.

Nominations of officers for the ensuing year were made.

Dr. ROOT spoke of the need of the Preparedness League for subscriptions to carry on its work. This matter was referred to the Council.

Mr. BAILEY, a representative of the Dental Protective Alliance, made a short address.

The Academy passed a motion indorsing the work of the Alliance.

The appointed essayist of the evening, Dr. A. B. Hirsh, was prevented from appearing by a death in his family. In his place Dr. J. H. DREXLER, Philadelphia, presented a paper on a "Method of Taking Modeling Compound Impressions with the Mouth Closed and Under Normal Biting Strain."

[This paper is printed in full at page 225 of the present issue of the COSMOS.]

DISCUSSION.

Dr. T. D. Casto. I heard our friend Dr. Greene describe his method of taking impressions at the Jamestown Exposition, in 1907; also at the Jamestown Exposition I learned to make gold inlays. My mind was absolutely filled up with the subject of gold inlays, and after coming home I forgot about Dr. Greene's method and did not use it.

I have been very successful in taking upper impressions, but I have to go on record as saying that I do not know how to take lower impressions with modeling compound. Many of my results have

not been as good as I should have obtained from modeling compound, so I think that I shall take some of Dr. Drexler's time, and learn to take lower impressions. I believe I can take an upper impression as well as it can be done, but it takes from half an hour to an hour.

Dr. Drexler. I never take less than an hour.

Dr. Casto. I think I get a good one very often in half an hour. It may not be correct, but it is so much better than what I can do with plaster that I am pleased with it. I usually take from forty-five minutes to an hour in doing this work.

Dr. W. J. Robinson. Modeling compound, to me, is not new by any means, because when I entered dental practice twenty years ago, it was in England. Modeling compound was used in England then, and plaster was comparatively unknown. In all these years I have been using modeling compound in the majority of cases, and have always had success with it, and for that reason have not been inclined to go entirely over to plaster. I have on numerous occasions seen Dr. Drexler do this work, and I have watched his results; they have been very successful. Anything that he says on this subject cannot but be of benefit to us.

Dr. S. P. Cameron. I think that we owe Dr. Drexler a cordial vote of thanks for coming here and taking the time so unfortunately broken up. I did not think one could take a decent impression with modeling compound until I saw it demonstrated. While we have obtained a pretty good idea from what Dr. Drexler has said, I think, on account of the short time he had in which to prepare his paper, the Academy should extend to him an invitation to come before us some other time with a patient and show us his work. He certainly understands taking impressions, does it thoroughly, and does it well.

Dr. W. S. Hewitt. I do not think that the importance of taking impressions can be overestimated. We are losing a lot of teeth, and are finding that bridges we put on years ago have to be abandoned for some form of removable denture. For that reason, I think the subject of dental impressions is a very pertinent one at the present time.

Dr. H. B. Matteossian. Clinical experience is the ultimate deciding factor in matters of practice, and I recognize from Dr. Drexler's paper that remarkable results can be obtained by the use of his method. There is, however, one question about partial impressions on which I should like to take issue with the essayist.

In the first place, regarding the accuracy of the work. There is no doubt that when plaster and modeling composition are both used with the best technique indicated for each of these substances, plaster will give the sharper impression and more accurate detail. I think this is generally admitted. Now, in the case of an undercut space, where we take the impression in plaster, it is not necessary to build the denture to the full breadth of the space into the undercut. It has been my custom to wax it up with judgment, so that the trial plate will go in place without binding, making it possible for the finished piece to slip in and out with a minimum of trimming. Given these conditions, the plaster impression, taken in the usual way, is preferable, provided the wax is suitably carved before investing. This will give a much sharper impression of all the parts and a better fit than can be obtained with modeling compound. We have all seen remarkable results secured by the use of compound for full dentures, but when it comes to the partial plate, the use of plaster will give better results than if we attempt to do the work with modeling composition. By a person of dexterity, like Dr. Drexler, success will no doubt be obtained with composition in all instances, but for the general practitioner, besides the comparative saving of time, plaster will prove superior, if used in the sensible way of not waxing up to the full width of the undercut space.

Dr. S. B. Luckie. I always admire a man who has faith in his technique. If he has confidence in that, he will make a success of it.

Like Dr. Casto, I saw Dr. Greene, at the Jamestown Exposition, take an impression with modeling compound, but did not pay much attention to it. Those who use modeling compound claim they get an equal impression of the soft and the hard tissues, which they say cannot be done with plaster. Possibly, if someone could work out a technique with plaster, he could obtain the same results with it as those who use modeling compound. I have not yet perfected such a technique. When I have a plate to make now, I endeavor to take the impression with modeling compound, and get a pretty good impression of the roof of the mouth. Then I try to get a good impression under the cheeks and lips, but in doing this it is necessary for me to spend something like an hour and a half or two hours. However, with the little experience I have had with modeling compound, I feel that I can get better results with it than with plaster. But as I do not make more than three or four plates a year, my experience does not amount to much.

Dr. Robinson. I use modeling compound exclusively in crown and bridge work where accuracy is absolutely necessary. A great many dentists make the mistake of not getting the compound cool enough before removing it, and that is why it draws. A number of men take a lower impression with a tray that has a handle on it, and when they take it out, they lift the tray up. The modeling compound is not hard, unless they have used ice-water, with the result that the compound draws and the impression does not fit in the back, when put in again.

Dr. F. A. Fox. I must confess my inability to take partial impressions with modeling compound. I can take the full cases, but the partial cases give me trouble. A great many times, when I have leaning teeth and V-shaped spaces to overcome, I am prone to use plaster in order to overcome the very condition of which Dr. Drexler speaks; this can be done very nicely by paralleling the impression. If you get the impression intact you can parallel the depressions made by the teeth. In doing so and preparing the cast from the impression we will have the V-shaped spaces eliminated. In this way we get the same result as with modeling compound, and still have the accuracy of the plaster impression. I have obtained the best part of my prosthetic knowledge from Dr. Gritman, who has shown me the most beautiful results. So, in that, I like to follow his method.

Dr. Drexler (closing the discussion). With reference to the question of Dr. Casto, I would say that the taking of a full lower impression with modeling compound is something entirely different from anything that he ever did with plaster. We do not use an impression tray to take a lower impression. The occlusal plane is what I take such an impression with. Supplee says he found out that it could be done with this from one of the dumbest men that he ever tried to teach. After attaching the compound to the bite plate and putting it in the mouth it is cooled and carved down to the arch and the length of the bite. Then we practically have a bite block. We take this occlusal plane, put an excess of modeling compound on the side next to the ridge, and ask the patient to close the lips. The tongue will prevent it from going back too far, and the lips will keep it from going too far forward. The patient is allowed to close down, and we let the compound cool. It does not matter if we have one or two spots where it touches the ridge. We have the start, and we can build up from that. We have the bite and lower impression at one time, and can then build the wings down on each side. The farther down we get the wings along the base of the tongue the less trouble we will have with the lower plate.

A dentist sent a patient to me who was having trouble with a little plate on the lower ridge, in an effort to relieve the trouble the dentist had placed two suction chambers in the plate, one on each side. I took a piece of modeling compound, attached it to each side of the plate, and put it in the patient's mouth to get the wings. Then I told her to

have the dentist put rubber where I had modeling compound. When this was done it was a very successful case.

Dr. Matteossian says that he carves the wax. He is only doing what I do with the modeling compound. I carve the compound.

Dr. Fox says to carve the cast, but how many men are capable of doing it? No man living can get it as it should be. Often you take a plaster impression and lose part of it, and build wax around to take the place of the lost plaster. Ninety-nine times out of a hundred you do not get it right. Dr. Luckie says that he takes the impressions with modeling compound, and, if they do not fit right, he adds plaster and makes a new impression. That is what Dr. Greene calls the last aid to the injured. I hope some day to give you a demonstration of how you can get an accurate impression of the worst mouth with modeling compound.

The society then adjourned.

THE DENTAL COSMOS

A MONTHLY RECORD OF DENTAL SCIENCE.

Devoted to the Interests of the Profession.

EDWARD C. KIRK, D.D.S., Sc.D., LL.D., *Editor.*
L. PIERCE ANTHONY, D.D.S., *Associate Editor.*

PUBLISHED BY THE S. S. WHITE DENTAL MFG. CO., PHILADELPHIA, PA.

SUBSCRIPTION PRICE, including postage, $1.00 a year to all parts of the United States, Hawaiian Islands, the Philippines, Guam, Porto Rico, Virgin Islands, Cuba, and Mexico. Canada, $1.40. To other foreign countries, $1.75 a year.

Original contributions, society reports, and other correspondence intended for publication should be addressed to the EDITOR, Lock Box 1615, Philadelphia, Pa.

Subscriptions and communications relating to advertisements should be addressed to the BUSINESS MANAGER of the DENTAL COSMOS, Lock Box 1615, Philadelphia, Pa.

PHILADELPHIA, MARCH 1918.

EDITORIAL DEPARTMENT

Dental Scientific Literature.

OVER a quarter of a century ago we published in this magazine a series of articles by the late Prof. W. D. Miller under the general title "The Human Mouth as a Focus of Infection." The papers in question are the embodiment of his findings and conclusions reached after a long period of research dealing with the microbiology of the oral cavity. Among other things Miller's findings made clear beyond all doubt that an infected mouth is a constant menace to the health of the body;—that the mouth is not only an incubator for the growth of a large variety and infinite number of bacterial organisms many of which are pathogens, and that the mouth is the principal portal through which disease-producing organisms find access to the body; but more particularly he furnished incontestable proof by laboratory experiment *in vivo* that

certain mouth organisms were capable of setting up metastatic inflammatory foci in other parts of the body by transmission through the blood tracts—a fact at present well recognized but at that time strongly disputed.

Since the above-mentioned publication of the principles involved in that phase of Miller's researches his findings have been confirmed by the clinical observations of Dr. William Hunter, published in 1911, and further by a large body of subsequent observers, with the result that both in dentistry and in medicine, and to a large degree with the lay public, the doctrines thus set forth have become accepted as the expressions of biologic law.

Moreover, as practical results flowing out of the publication of these discoveries, the whole complexion of dental practice and dental education has undergone fundamental changes that are little short of revolutionary. Formerly a distinct line of demarcation was assumed to exist between what we are wont to designate as operative dentistry and prosthetic dentistry respectively, and it was difficult if not impossible for the purely mechanical dentist to realize that the products of his handicraft involved even remotely any relation to the principles of physiology, pathology, or anatomy. Today these elementary biologic considerations are controlling factors in the adaptation of every dental prosthetic fixture, from a filling in a carious cavity to complete substitutions for the natural dentures. And a still further resultant of these pioneer researches of Miller is the universal recognition of the indispensability of oral hygiene as a means of prophylaxis against local and general disease originating in mouth infection. It is mainly the work of Miller that has in course of time reoriented the dental problem and diverted the attention of the dental profession in a proper degree from the business of repairing dental defects to the larger and more logical problem of preventing them.

No student of dental history can fail to realize the epoch-making character of this pioneer work, yet it has required more than a quarter of a century for the fundamental truths of these researches to bear their legitimate fruit. Miller's early papers were regarded by the mass of the dental profession as the effusions of a scientific dreamer, impractical and without value or helpfulness to the dental practitioner in the solution of his problems. When the *Independent Practitioner* and the DENTAL COSMOS

first gave space to these scientific contributions the cry was that they were "uninteresting," "impractical," "too deep," and "over the heads of the majority of dental readers." The demand for the so-called "practical" in dental literature was so general and so insistent that it required no small amount of editorial courage to inaugurate and maintain a policy favorable to the publication of reports of scientific research concerning which the average reader could discern no direct application to his practical needs.

Time has amply demonstrated the wisdom of the editorial policy of keeping the dental profession in touch with the latest advances in scientific research having relation to dentistry. What was at first a scientific dream is today a materialized fact in dentistry as in all other departments of human activity. The principles evolved by Miller a quarter of a century ago are the working formulæ of the present time. His work is still bearing fruit. The recent discovery of the infecting organism of gas gangrene undoubtedly had its origin in Miller's discovery of a group of gas-producing organisms having their habitat in the gastro-intestinal tract and concerned in pulp gangrene and certain types of dento-alveolar abscess. We publish in this issue a continuation of the report by Professor Prinz of his investigations of the diastasic action of salivary enzymes, from which incidentally we quote the following paragraph:

> In eating salt-free breadstuffs, unconsciously we reach for the salt-cellar to facilitate the ready munching of the sticky food bolus by rendering it more "palatable." In reality, we activate the salivary amylase to its optimal point, and thereby quickly change the tasteless, pasty mass into a sweet-tasting semi-liquid mixture.

Doubtless to the self-styled practical man the foregoing statement will be regarded as being "over the top" of his comprehension, and will therefore be placed in his category of the impractical. As a scientific truth it will, we think, be classed as a physiologic discovery of the first magnitude. Taken in connection with the findings of Pawlow relative to the nervous response to special stimuli as affecting salivary secretion, the activating function of salt on the salivary enzymes becomes not only an important nutritional factor but an influence controlling the mechanism of deglutition, besides the relation which it bears to caries immunity and susceptibility as shown by Prinz.

No, we have no apology to make for presenting the latest advances of dental science to our readers. There always has been and always will be a certain proportion of readers who complain that it is "over their heads," but when science is really science, then it is the truth—in which case the trouble is with the "heads," and not with the truth, when it overshoots its mark.

BIBLIOGRAPHICAL

SURGERY AND DISEASES OF THE MOUTH AND JAWS. A Practical Treatise on the Surgery and Diseases of the Mouth and Allied Structures. By VILRAY PAPIN BLAIR, A.M., M.D., F.A.C.S., Professor of Oral Surgery in the Washington University Dental School, and Associate in Surgery in the Washington University Medical School. Third Edition, revised so as to incorporate the latest War Data concerning Gunshot Injuries of the Face and Jaws, compiled by the Section of Surgery of the Head, Subsection of Plastic and Oral Surgery, Office of the Surgeon-general of the Army, Washington, D. C. With 460 illustrations. St. Louis: C. V. Mosby Co., 1917.

The third edition of this well-known text-book on Oral Surgery has been revised to meet the demand for a work on this subject that would include the most recent approved methods of treatment of the wounds and injuries received in battle in the present world war, which up to the present have not been embodied in a text-book. The extent and character of wounds of the head and face by reason of modern methods of warfare have resulted in a closer collaboration between the oral surgeon and the general surgeon, and the author of the present work has made a laudable effort to place in the hands of the student and practitioner the advanced methods being used as the result of the experience of those who have thus far served in caring for the unfortunate victims of the great conflict.

The present revision has been made under the direction of the Section of Surgery of the Head of the Medical department of the army, and while the revision is confined almost entirely to that portion of the book which relates to injuries received in the war, the author has included some very valuable observations. on cancer of the mouth.

There will doubtless be, and indeed there have already been presented, many new methods of treating injuries of the face and jaws growing out of the experience of oral surgeons in treating the varied and extensive wounds being received on the battlefield, but the present emergency has created a demand for the collation of all available material for immediate use in preparing the younger men of the profession for war service.

The Medical department of the army is fully cognizant of the need of a comprehensive manual on oral surgery for use in preparing members of the Dental Corps for war service, and has in view the preparation of such a manual, but the immensity of the task and the necessarily incomplete data at present for its preparation has impelled the author of the present work to present the revision of his book in an endeavor to record the data thus far collected in order that it may be made immediately available to dental surgeons who are offering their services to the Government, and we believe that the present work will meet this demand in a satisfactory manner.

The book still retains all the features which have given it a foremost position as a text-book on Oral Surgery.

Books Received.

Books received are acknowledged in this column, and such acknowledgment must be regarded as a sufficient return for the courtesy of the sender. Selections will be made for review in the interests of our readers and as space permits.

"Dentistry in the Bible and Talmud." A Valuable Contribution to the Early History of Dentistry. By Dr. Samuel Greif, Author of "Who's Who in Dentistry." New York: "Who's Who" Dental Publishing Co., 1918.

"Actas del VIII Congreso Dental Español" (Eighth Spanish Dental Congress), celebrado en Bilbao en Septiembre de 1916. Por Florestán Aguilar, Presidente de la Federación Odontológica Española. Imprenta de *La Odontología*, Madrid, 1917.

"Modern Dentistry." By Joseph Head, M.D., D.D.S., Dentist to the Jefferson Hospital, Philadelphia. Octavo of 374 pages, with 309 illustrations. Philadelphia and London: W. B. Saunders Co., 1917. Cloth, $5.00 net.

Review of Current Dental Literature

[*British Dental Journal*, London, October 1, 1917.]

Further Experiments with the Use of Bone-Grafts, Being Abstracts from Recent German Publications. By W. H. Dolamore.

The practical inaccessibility of current German professional literature enhances the value of Dolamore's article. That the operation for the restoration of lost portions of the mandible by means of bone-grafts is still in the experimental stage is admitted by all writers. Nevertheless, such experiments are justified, because a prolonged treatment with a favorable result is better than chronic invalidism.

In the first place there appears to be a consensus of opinion that after the insertion of the graft the mandible must be fixed against the maxilla by ligatures passing between two fixed splints, so as to maintain absolute rest.

Instead of using grafts taken from the tibia, many surgeons now take them from the crest of the ilium. Briefly, the advantages claimed for this selection are—

(1) The operation is shortened, since, the bone being already curved, time is saved in fashioning the graft, hence there is less chance of its getting cold and dry.

(2) The patient is saved the worry of anticipating a weakened leg, which is not wholly visionary.

(3) Union with the mother bone follows more quickly, probably because of the greater amount of medullary tissue, and because vas-

cularization takes place more easily in this spongy bone than in the compact tissue of the tibia.

(4) There is a greater formation of callus, hence the graft grows in thickness and strength.

Imbert, Lheureux, and Rouslacroix (*Revue de Chirurgie*, 1916, p. 111) favor the use of cartilaginous grafts in the repair of facial defects. The graft was disposed of not as a sequestrum, but biologically organized and ultimately replaced by fibrous tissue.

The operators all prefer conductive anesthesia to a general anesthetic. When the operation is performed under a general anesthetic the fixation of the parts must be delayed for twenty-four hours, but no harm apparently results.

During the operation it is possible to expose a portion of the parotid gland. If this portion be small it is preferable to remove it. Failure to do so may result in saliva flowing out of the wound, which may eventually lead to suppuration and the death of the graft.

[*Journal of the American Medical Association*, January 26, 1918.]

The Comparative Efficiency of Local Anesthetics. By Torald Sollman.

The clinical desirability of a local anesthetic is determined on the one hand by its anesthetic efficiency, and on the other hand by the degree of local irritation and by the systemic toxicity. The present investigation does not touch on the questions of irritation and toxicity, but is confined to the subject of anesthetic efficiency.

These investigations justify the following conclusions as to the suitability of local anesthetics for clinical uses, mainly from the standpoint of efficiency.

(1) For the anesthesia of the mucous surfaces cocain, beta-eucain, alypin, and tropacocain are the most useful; quinin-urea hydrochlorid is fairly active; apothesin, novocain, and potassium chlorid are relatively inefficient. Alkalization increases the efficiency from 2 to 4 times. The solution of the anesthetic salts may therefore be mixed with an equal volume of 0.5 per cent. sodium bicarbonate, without loss of efficiency and with a saving of one-half of the anesthetic. These mixtures, however, do not keep well. The addition of epinephrin does not increase the efficiency, and is probably useless.

(2) For infiltration and injection anesthesia, cocain, novocain, tropacocain, and alypin are about equally efficient; beta-eucain and quinin-urea hydrochlorids are intermediate; apothesin and potassium sulfate (or chlorid) are relatively inefficient. The efficiency is not increased by alkalization. Epinephrin greatly prolongs the action, and should always be added—except to tropacocain. The anesthetic action of potassium sulfate or chlorid is not great enough to be of real value; however, it may well be used in place of sodium chlorid for making anesthetic solutions—1 per cent. solution is isotonic.

In view of the fact that several synthetic anesthetics can completely take the place of cocain, it would be feasible to prohibit entirely the importation, manufacture, sale, and use of the habit-forming cocain, except for scientific purposes.

The details of these investigations can be found in full in papers published in the *Journal of Pharmacology and Experimental Therapeutics*.

[*La Odontolgía Argentina*, Buenos Aires. September 1917.]

A Case of Pyorrhea Alveolaris Treated by Intramuscular Injections of Emetin Hydrochlorid. By Juan Ubaldo Carrea.

The author believes that he has here to record a case where the happy employment of emetin (intramuscularly) was successful after all other forms of treatment had failed, even the local use of emetin.

The patient was a man of thirty-one, a physician, with a well-marked and extensive pyorrheal infection. Nowhere in this report is there mention made of instrumentation. The context would lead one to believe that at no time was recourse made to the scaling of the teeth and the polishing of the root surfaces.

The injections were carried out by a surgeon. One cc. of the solution contained 0.03 gram of emetin hydrochlorid. The number of cc. injected at each treatment is not told. The injections were made intramuscularly in the gluteal or brachial regions, and repeated every two days until a total of 12 had been made. After the first 4 injections a diminution

of pus was obvious; after 8 injections, still less pus, mastication was less troublesome and painful, the teeth were firmer, and the fetor of the breath had disappeared. Four more injections were given.

The patient suffered no inconvenience whatever. The sole incident upon which he remarked was a slight salty taste. The case cleared up entirely.

Carrea interprets the results as follows: The efficacy of emetin depends upon the time during which it is in contact with the pyorrheal agents to be destroyed. By the intramuscular injection there is a saturation of the system, with subsequent buccal elimination (suggested by the salty taste in the mouth). This insures the desired duration of contact of the remedial agent with the etiological factor in the disease.

[*Journal of the American Medical Association*, November 17, 1917.]

Toxic Factors of Some Common Anesthetics. By Evarts A. Graham.

The *New York Medical Journal* thus summarizes Dr. Graham's paper: Dr. Graham points out that many of the unexpected and disastrous results which follow operations are due to the effects of narcosis in a more or less direct way. These effects may result promptly or may be several days in coming on. Narcosis is always associated with a state of diminished oxidation and more or less severe tissue asphyxia, and secondarily to these two factors with a more or less marked acidosis. Nitrous oxid has a very slight tendency to induce these toxic effects, ether has a somewhat greater tendency, and chloroform has a very marked tendency to their production. This is due not only to the effects of the narcosis itself in the case of chloroform, but also to the fact that this agent is very unstable, and is readily broken down with the production of hydrochloric acid. The morphological changes in the tissues in late chloroform poisoning are almost wholly due to the effects of the hydrochloric acid. This is shown by the fact that the drug readily yields this acid; that hydrochloric acid induces similar changes in experimental animals; that free chlorin and free hydrogen ions can be recognized in excess in the livers of animals poisoned with chloroform; that other chlorin substitution products of methane vary in toxicity with the amount of hydrochloric acid which they can liberate; and that the simultaneous administration of suitable amounts of alkali and chloroform results in a marked diminution in the tendency for poisoning to result. Further confirmation is found in the fact that the iodin and bromin substitution products of methane can produce effects indistinguishable from those of chloroform. The halogen substitution products of ethane are similarly capable of causing the same type of lesions. In addition to these toxic effects resulting from the production within the body of a strong mineral acid, or of an asphyxial acidosis, other factors such as acetone may play a part. And, finally, it is to be remembered that the common anesthetics are often capable of dissociating in a way which leaves unsaturated bivalent carbon compounds that may be toxic.

[*Dental Review*, Chicago, January 1918.]

The Porcelain Jacket Crown. By D. N. Lewis.

The author constantly emphasizes that this work demands the highest technical skill and the most painstaking attention to every detail. The sinister possibilities of any nonvital tooth, whether intentionally or accidentally devitalized, will make the practitioner welcome those prosthetic procedures which permit the preservation of a tooth's vitality. Lewis firmly believes that the porcelain jacket crown meets this desideratum, and in this sense he calls for its revival and its more general employment. He epitomizes his technique as follows:

Select the shade. This may be advantageously approached by the method of elimination. Prepare the tooth for the reception of the crown. For this the bulk of the enamel is ground away. The cervical circumference is measured to make a band of German silver or copper, 12 mm. wide, which is contoured and festooned. Around the tooth grind a square shoulder 1 mm. in depth just beneath the free margin of the gum. Using the band as a tray, take an impression of the tooth in modeling compound. Take a bite in pink wax, and obtain an impression of the whole region in plaster. The covering of the tooth

with cement brings the first sitting to a close.

Make an amalgam die in the modeling compound impression which was taken in the band. For convenience this die may be set in a plaster base. Using the same measurement wire from which the copper or nickel silver band was made, cut a triangular piece of 1/1000 platinum foil about 2 mm. larger than the length of the wire. This foil is swaged or burnished to the die. The lateral portions of the foil are brought together flatly, so as to fold into a "stovepipe joint" on the lingual surface of the die. The foil is removed from the die, while the die is placed in the plaster impression, of which a plaster cast is run. The bite is applied and the whole placed in an articulator. On separation the platinum foil matrix is replaced on the die, and upon it is built up the desired shade of high-fusing body. This is carved, fused, retouched, and re-fused. The foil is removed, and the jacket crown is ready for cementation in place upon the second visit of the patient.

[*American Journal of Surgery*, New York City, January 1918.]

Technique of Wiring Corresponding Teeth of Superior and Inferior Maxilla in Fracture of Inferior Maxilla. By Edmund Butler.

Reduce the fracture, judging the results by the occlusion of the teeth. If a tooth is loose in the line of fracture and prevents correction of the position of the fragments, remove it. When the occlusion is correct select the teeth to be wired, usually the first molars on the sound side, the second incisors anterior to the line of fracture, and the first sound tooth posterior to the line of fracture, on the fractured side. If the line of fracture be posterior to the teeth in the region of the angle of the mandible, the inclusion of the first molars on both sides is sufficient. When the fracture is double, only individual judgment will map out a correct procedure.

After the teeth have been chosen as suggested above, separate the jaws. Six cm. length of copper wire, No. 26 or smaller, are cut from a spool such as is used by an electrician. The maxillary teeth are first prepared. Slip the end of the wire through the distal interspace, with a curved hemostatic clamp direct the wire around the lingual surface, and out through the approximal interdental space. Now grasp each end with a clamp and twist the protruding ends, the first twist fixing the wire around the tooth, and continue to twist until about six twists are made, the remaining twists falling into space distally—the wire must be proximal to the surface of approximal contact—and take the shape of the cervical circumference. If these details are fulfilled the wires do not slip, and future adjustments are not needed.

The remaining selected teeth of the maxillæ and the corresponding teeth of the mandible are now prepared in the same manner.

Having the wires in place, force the mandible into correct occlusion, twist or hook wires of corresponding teeth together, cut off superfluous ends, turn the rough ends against the teeth and guard each with dental wax or soft vulcanizable rubber.

The patient is nourished by crushed, scraped, or liquid food forced through a catheter passed posterior to the last molar or through the space of an absent tooth.

If unable to use the corresponding teeth, an oblique position of the wires is permissible, so long as the obliquity is in the direction which prevents the deformity from recurring. The wires may be removed from the fourteenth to the twenty-first day. The longer period is usually advisable.

[*Annali di Odontologia*, Rome, January 1918.]

Three Rare Cases of Replantation of the Teeth. By Angelo Chiavaro.

It is of interest to consider Chiavaro's article in connection with the view advanced by John S. Marshall (see Dental Cosmos, February 1918, p. 169). Marshall has for a long time advocated the extraction of teeth affected with persistent chronic apical inflammation, their extra-oral treatment and eventually their replantation. In this way Marshall assures us that clinically a large majority of teeth can be saved and made useful members of the dental economy.

Most pertinent confirmation of this attitude is afforded by Chiavaro's paper. Chiavaro has earned the right to be heard with attention,

and his statements must be taken at their face value.

The first case concerns that of a young woman whose four mandibular incisors contained gangrenous pulps. The condition had even progressed to the appearance of a mental fistula. The teeth were extracted, disinfected, the radicular apices were rounded off (to remove the necrosed cementum), and the pulpal cavities were filled with gutta-percha. The fistula was healed, and one week after extraction the teeth were replanted. In about six weeks they became firm, and after almost eleven years they are still firmly in place.

The second case concerns a young lady whose right maxillary second incisor had a chronic abscess. The external plate of the alveolus was destroyed for about one-third of its length, and on the labial surface of the root there was a large cavity communicating with the pulp chamber. The tooth was extracted; a large porcelain inlay was inserted in the cavity, and the tooth replanted. In about one month it had become firm. After the lapse of four and a half years it is still very firm, the gum has not at all receded, but is perfectly normal, even where it is in contact with the porcelain inlay.

The third case is that of a medical student upon whose left mandibular first molar there was a large abscess. It was extracted, and two weeks later it was replanted. Although the socket had been enlarged by Ottolengui's special burs, there was much difficulty in completely reorienting the molar. This was overcome only by the patient strongly occluding his teeth. The replantation was successful.

From these three cases Chiavaro draws the following conclusions: (1) If the alveoli are existing, the contemporary replantation of mono-radiculated teeth is successful; (2) there is a possibility of success in the replantation of a single-rooted tooth, even if a large area of the surface of the root be restored with a large inlay and the corresponding alveolar tissue be absent; (3) if there be great resistance offered to the proper reorientation of a molar (multi-radiculated tooth), success may be obtained, better than by any other means, by the strong occluding of the teeth.

Nowhere in this paper is it made exactly clear why Chiavaro postpones so relatively long the replantation. Perhaps this delay is to permit time for the eradication of the periapical disease focus. Marshall replants the tooth at the same sitting at which it is extracted.

Perhaps it is significant that the three successful cases recorded here were those of relatively young individuals. The vitality of youth is in general a potent factor in facilitating and accelerating reparative processes. Chiavaro mentions a case where replantation failed. The patient was a woman of forty-six years.

It is regrettable that the author has not offered radiographic data upon the condition of the teeth and their surrounding parts after the lapse of a number of years. This information would be still further enhanced in value if we could have a radiographic record of the condition of the teeth before replantation was resorted to.

[*Journal of Parasitology*, Urbana, Ill., September 1917.]

Endamœba Buccalis: (II) Its Reactions and Food-taking. By Nadine Nowlin.

In the Cosmos for September 1917, page 933, is to be found an abstract of Nowlin's first contribution on this organism. In that study we were led to expect in a further report some data upon the intracellular occurrence of E. gingivalis in tonsillar tissue. In the present paper no mention is made of this problem. It is to be hoped that this phase of the question has not been abandoned.

The author reveals some unfamiliarity with practical dentistry, and from this standpoint this paper is open to some unfavorable criticism; but obviously the primary purpose of the work was to investigate the biology of the parasite. This forms an interesting contribution.

The material for the present paper was collected from the same source as that of the previous study—a single host and a single point of infection, a maxillary premolar. E. gingivalis exhibits a more marked positive thigmotaxis than do free-living amœbæ. It manifests no differential sensitiveness to light. The organisms are very sensitive to thermal changes. "No endamœbæ under observation during this study, though they have been watched carefully for this, have been seen to ingest leucocytes, red blood cells, as

described by other writers, notably Smith and Barrett, or any solid except bacteria and these in small numbers." This is contrary to the conclusions of Goodey and Wellings. (DENTAL COSMOS, December 1917, p. 1268.)

E. gingivalis absorbs its food mainly, taking up by osmosis the fluids of leucocytes or other media on which it rests; stores these colloidal substances in vacuoles, and by secretion of its own enzymes assimilates these as needed. The reasons against believing that large food vacuoles are ingested leucocytes may be summarized thus: (1) There is never but one body to a vacuole, while most leucocytes have a one- to three-lobed nucleus; (2) there is never any granular area around the vacuolar inclusions, as would be expected if the cytoplasm of a leucocyte were ingested; (3) leucocytes have been surrounded by amœbæ, but never ingested, according to Nowlin's observations; (4) the whole system of vacuoles can vanish from an E. gingivalis exposed to unfavorable conditions sooner than would be possible if these were solid inclusions; moreover, the leucocytes outside the endamœba are left intact.

This method of food-getting by absorption would explain the shrinkage of gums where E. gingivalis is present. There appears to be no evidence that these organisms penetrate epithelial cells, but there is abundant evidence that they draw supplies by applying themselves to the surface of the tissues and by crowding between them.

[*La Restauration Maxillo-faciale*, Paris, November 1917.]

The Oculo-cardiac Reflex in Cases of Contractures of the Jaws. BY R. DUCHANGE.

This reflex is manifested by a diminution of the number of radial pulsations under the influence of pressure on the eyeballs. The reflex has been observed among the wounded affected with traumatic ankylosis of the limbs.

For the present purpose two series of individuals were taken, (1) those with fractures without contractures, and (2) those with contractures. In the first series the diminution in the number of pulsations was only by about one-fifth, which is normal. In the second series the mean diminution was by one-half.

The figures indicate that among those with maxillary contractures, the oculo-cardiac reflex is positive. Consequently these patients come under the general law.

[*Journal of the National Dental Association*, January 1918.]

The Treatment of Root-canals with Putrescent Pulps. BY CARL J. GROVE.

The tooth is radiographed to supply data upon which the treatment may be planned. A sterilized rubber dam is applied, including as few teeth as possible, because every tooth is an additional source of contamination. After it has been applied the rubber dam and the isolated teeth are painted with full strength tincture of iodin, which is shortly washed off with ethyl alcohol. At the first sitting do not attempt to enter the canal to any extent. To do so might force septic material through the apical foramina. Apply chloral hydrate and thymol, equal parts, in a small amount of alcohol, to neutralize the chemical tissue irritants in the canal's putrescent material, and to kill the micro-organisms. This dressing is hermetically sealed in, to be left three or four days, or even for one week with impunity.

At the second sitting, after preliminary isolation and attempted sterilization of the teeth—this of course must be done at each sitting—an effort is made to cleanse the canals with a sterile barbed broach. No attempt should be made to reach the apex. Grove insists strongly that whatever instruments are needed at this or any other visit must be sterile. After the canals have been fairly well cleaned, flood the chamber with alcohol and dry with hot air. There are three reasons for using alcohol at this time—(1) for further sterilization, (2) desiccation before application of medicaments, and (3) desiccation to inhibit bacterial growth. Grove regards this procedure as a very important step in the treatment of septic root-canals. Into the canals is now sealed a dressing, as at the conclusion of the first sitting.

At the patient's third visit a serious effort is made to cleanse thoroughly the canals. The author mentions the use of the sodium-potassium alloy, and of acids, in this connection. The material for the definitive filling, as far as Grove puts himself on record in this paper, is left to the individual practitioner's discretion. The canals should never

be filled if the seepage of serum persists in discharging from the apex.

There are three salient points to this paper, which while not original, are yet perhaps not as generally appreciated as they deserve:

(1) The strictest possible asepsis in all details throughout the whole treatment.

(2) The initial treatment, which essentially consists in the application of an antiseptic and neutralizing agent to the putrescent contents of the canal. These contents are disturbed at first as little as possible. This step is a precaution to prevent the mechanical forcing through of toxic material into the periapical tissues. This second point is really only a phase of the third and following point.

(3) The most scrupulous care not to irritate the periodontal ligament in any way. Any agent or procedure which would tend to weaken the vitality and health of this structure would expose to defeat the whole purpose of the entire treatment. For this reason, Grove dwells on the dangers of forcing part of the putrid canal contents through the foramina, of allowing any sterilizing or cleansing agent employed in the canal to extend to the apex (avoid those irritants, *e.g.* formalin, which are not decidedly self-limiting), or of attempting to enlarge the foramina mechanically. By so doing the periodontal ligament at the orifice will surely be destroyed or injured to such an extent that it may become diseased.

[*New York Medical Journal*, January 12, 1918.]

Relation of Chronic Infection to Thyroid Deficiency. By Harvey G. Black.

This report appears to be but a summary of a statistical study, which it is to be hoped will be published in full. There were a hundred patients in his series. Oral sepsis and inflammatory diseases of the gall-bladder and appendix played an important rôle in the relation of chronic focal disease and hypothyroidism, comprising 63 per cent. of the 255 infections present in the series. Oral sepsis, including tonsillitis, root-abscesses, pyorrhea, sinusitis, etc., represented 36 per cent. of the total infections, and occurred in 56 of the cases.

Periscope

Relief of Post-extraction Pain.—It often happens that extreme pain follows the extraction of a tooth or root. Almost immediate relief may be given the patient by inserting a pellet of cotton wet with chloroform to the full depth of the root-socket, and placing the finger firmly over the mouth of the socket for from ten to twenty seconds; then remove the cotton from the socket. Repeat if necessary.—H. A. Cross, *Dental Review.*

Veronal and Novocain to be Made in America as Barbital and Procain.—The Federal Trade Commission which has already issued licenses to three manufacturers to make salvarsan in the United States under the name of Arsphenamine, has recently issued a non-exclusive license for the manufacture of veronal to the Abbott Laboratories of Chicago. It is stipulated that the name Barbital shall appear on the package together with the scientific name diethyl-barbituric acid. The name veronal may also be used on the package in an explanatory sense. The commission has also issued licenses to the Rector Chemical Co. of New York, and to the Farbwerke-Hoechst Co. of New York, for the manufacture of novocain under the German patent, with the stipulation that it shall be designated as Procain. The licensees are required to pay 5 per cent. of their gross receipts to the Federal custodian of alien property. The commission reserves the right to fix the prices on these drugs if it should become necessary. These three synthetics are the first for which licenses to manufacture have been issued under foreign patents by the Federal Trade Commission, and physicians would do well to make a note of the new names assigned to the drug by the commission.—*N. Y. Med. Journal.*

Tempering Small Tools.—Fill the tin top of a catsup bottle with melted beeswax, and place conveniently on the work-bench. When tempering hold the instrument—as a chisel—above and near the wax; with the blowpipe heat to a dull red, and quickly push the instrument into the wax. The degree of hardness depends on how rapidly the instrument is pushed into the cold wax.—J. T. SEARCH, *Dental Review*.

An Aid in Crown and Bridge Soldering.—The Richmond crown and certain parts of bridge work present difficulties in the soldering technique, due to the fact that the solder refuses to flow into those V-shaped spaces at the gingival portion over the facing. This may be overcome by clipping up some scrap 22-k. plate, fluxing it, and partly filling the space with this scrap; then continue in the usual manner. These bits of scrap also serve to advantage in preventing the solder from reducing the karat of the cap and backing.—*Pacific Dental Gazette*.

To Hold Cotton Rolls in Place While Operating.—Frequently a cavity may be kept dry long enough for a treatment or for the placing of an amalgam filling by the use of cotton rolls without the rubber dam. The problem is to keep the rolls in place, particularly in the lower jaw, where the tongue always has a tendency to toss them out of position. This may be obviated by slipping an ordinary rubber dam clamp over the tooth after the rolls are in place, allowing the beaks of the clamp to grasp a small portion of the roll between the clamp and the tooth. This will hold the roll securely, and will also prevent the clamp from hurting.—*Dental Review*.

How to Get the Best Results in Casting Watt's Metal Plates with Porcelain Teeth.—After the wax model has been properly invested in a casting flask allow the investing material to dry for one hour. Then place it on a low flame for forty-five minutes, and on a high flame until the whole investment block is red-hot. In order to prevent the checking of teeth which is likely to occur by the difference in the expansion or contraction of Watt's metal and porcelain, the flask should be allowed to cool for thirty minutes. Melt the Watt's metal, pour it in the flask, and allow it to cool. As I have cast Watt's metal for a number of years with the best results, I am positive that some fellow dentist will profit by adopting this method.—JOHN V. AMENTA, *Dental Review*.

Free Dentistry in New Zealand.—The Auckland Hospital and Charitable Aid Board established in 1909 a free dental department for the benefit and accommodation of those who are not able to have their teeth properly taken care of in the community, since which time 23,555 persons have made application for treatment. During the time which has elapsed 18,530 teeth have been extracted, 11,919 fillings put in, and 1264 vulcanite dentures made. The staff at present comprises two dental surgeons and two attendants, besides a number of honorary members of the staff who have given their services free of charge. In return for this free service the hospital board has given the dental association free use of a portion of the hospital for housing a valuable dental museum presented by a prominent individual of the city of Auckland. It seems that at present there is no very marked shortage of dentists in this part of New Zealand at least, but owing to the additional year added to the course of study, making it four years before graduation, there are but few young men willing to give that time to enter the profession.—CONSUL-GENERAL ALFRED A. WINSLOW, Auckland.

Should the X-Ray Diagnosis Supplement or Supersede the Clinical?—In a broad sense, and generally speaking, the X-ray should be used to substantiate, supplement, and amplify the clinical diagnosis. By following this plan one's skill in clinical diagnosis may be very highly developed, while if the reverse order were adopted the clinical art would be lost. The use of the X-ray tends strongly to lead one away from a clinical study of his problems. Exceptionally the clinical picture is so obscure that it becomes necessary to depend almost entirely on the X-ray findings for a diagnosis. This is especially true where there are no local subjective symptoms, and where the objective and remote symptoms are poorly defined. This type of cases is to be found among the chronic apical infections, supernumerary, unerupted, and deeply buried teeth, etc. With these exceptions we still have the majority of cases in which a clinical diagnosis may and should precede the X-ray study. On the other hand, especially in acute pathology, the clinical manifestations may be the only dependence in making a diagnosis. In the early stages of acute inflammation, before any gross destruction of tissue has taken place, the X-ray findings are unsatisfactory. This is likewise true in acute extensions of pathologic conditions surrounding chronic foci.—R. J. WENKER, *Dental Review*.

To Avoid After-Pain in Extraction.—Pain following extraction is usually due to the fact that the socket contains no blood-clot. The condition usually occurs in sockets where the normal outline has been destroyed. It is seldom that the clot will remain in an injured socket. Without the protection of the clot the socket becomes infected, and pain results in a few days, if it has not persisted since the time of operation. Dry socket occurs also as the result of the use of hydrogen dioxid. The action of this preparation breaks up the clot and it becomes infected or falls entirely out of the socket.

The treatment of these cases is to cleanse the socket and apply some agent which will be both antiseptic and anodyne. A good rule to follow is to apply this treatment to all sockets where a difficult extraction has been made. The remedy which I employ consists of a combination of chloretone and essential oils which is put out by Parke, Davis & Co. under the name of Dentalone. This remedy proves very efficacious. The chloretone is both antiseptic and anodyne, and the pain is quickly controlled. The essential oils prevent the dressing from becoming foul in a short time, as is the characteristic of most dressings which are employed. Twenty-four hours is not too long, and even forty-eight hours will bring the patient back the dressing still retaining the odor of the essential oils.—J. P. Henahan, *Dental Summary.*

A Method of Filling Root-canals.—Open the pulp chamber until the root-canals are easily accessible, and then proceed to enlarge them to the best possible advantage with a fifty per cent. solution of sulfuric acid. Neutralize this acid and thoroughly dehydrate. Fill the canals with Callahan's resin solution and pump it to the root-apex with a fine, smooth broach; then dry with hot air. This hermetically seals the dentinal tubuli. Eucalypta-percha compound is then used as a canal lubricant. This compound, when cold, should be very heavy and stiff, or in a molding stage and not a flowing stage; it should be heated to a temperature of not less than 200° F. in a water-bath, at which temperature it will be found to be very soft, and to flow very readily. This hot eucalypta-percha compound is then pumped into the canals, using for this purpose a very fine, smooth broach. As soon as the operator is satisfied that the canal is filled to the end with this solution, a small point of gutta-percha is introduced into the canal. The smooth broach is at once forced down along the side of this point and room is made for a second one, which is sent gently to its place alongside the first one. This is repeated until the small, smooth broach can no longer be forced into the canal to make room for additional points of gutta-percha. The canal then should be filled to within approximately one to three millimeters of its mouth. A point of larger dimensions is then inserted that will just about fill the mouth of the canal. This is pressed firmly to place with large canal pluggers, and lastly given two or three light blows with a mallet to firmly seat the entire mass. This will give you a canal filling that by no means is proof against failures, nor is it above criticism, but the technique is easily mastered and can be put into thoroughly successful practice by any dentist. The time consumed by this method is but little if any more than that of the other techniques, and in my hands has been more successful.—I. L. Furnas, *Dental Summary.*

Surgical Technique of Root Resection in Granuloma Cases.—A crescent-shaped incision through the gum tissue and periosteum is made approximately three millimeters above the cervical line, or below it for a lower tooth, and the periosteum with its superimposed gum tissue is elevated with a periosteotome to a point one millimeter beyond the apex of the tooth to be operated upon. The incision must be sufficiently large to give an unobstructed view of the operative field.

If the outer plate of bone is intact it is burred, chiseled, or curetted away to the diameter of the pyogenous granuloma, and this pathologic tissue may then frequently be removed from the crypt intact, excepting its immediate circumferential attachment to the periphery of the pericementally denuded root. The exposed apex and the crypt is then sponged with ninety-five per cent. phenol, being careful not to touch the soft tissues with the acid.

A No. 9 round bur is used to resect the root to the point where it is supported by the pericemental fibers which are attached in the canaliculi of the alveolar socket and between the lamellæ of the cementum, beginning the resection at the apex of the root.

The remaining root-end is then rounded peripherally and polished with mounted cylindrical stones. A self-retaining cavity is then prepared in the root-canal, and filled with sterile amalgam. Before the amalgam is inserted the crypt should be freshened with the curet and sterile cotton pellets packed into the crypt, around the mesial, distal, and lingual aspects of the root-end, and the cavity

for the reception of the amalgam filling sponged with phenol, followed with seventy per cent. alcohol.

The filling must be smoothed off flush with the cavity margins, and the pellets of cotton removed, carrying the excess of amalgam from the crypt. The crypt is then flushed free from débris, dried, and sponged with tincture of iodin, followed by seventy per cent. alcohol. The retracted muco-periosteal flap is then released and sutured back to position with interrupted horse-hair sutures, bringing the knots crownward below the suture line. cutting close to the knots.—CARL D. LUCAS, *Dental Summary.*

Orthodontic Nomenclature.—The Committee on Nomenclature of the American Society of Orthodontists recommends the use of the following terms:

Neutroclusion to designate such malocclusions as are characterized by normal mesiodistal or normal antero-posterior relation of the lower arch to the upper arch.

Distoclusion designates such malocclusions as are characterized by a distal or posterior relation of the lower arch to the upper arch.

Mesioclusion to designate such malocclusions as are characterized by a mesial relation or anterior of the lower arch to the upper arch.

Malpositions of the teeth to be defined as the relation which the individual teeth bear to the line of occlusion, the median line of of the face, and the individual denture.

Mandibular teeth to be used in preference to lower or inferior teeth.

Maxillary teeth to be used in preference to upper or superior teeth.

Mesioversion—A tooth which occupies a position too near the median line of the face.

Distoversion—A tooth too far from the median line of the face.

Buccoversion—A tooth which occupies a position buccally to the line of occlusion.

Linguoversion—A tooth which occupies a position lingually to the line of occlusion.

Supraversion—A tooth which is too long as related to the plane of occlusion.

Infraversion—A tooth which is too short as related to the plane of occlusion.

Torsiversion—A tooth which is rotated on a perpendicular axis.

Transversion—A tooth which is in the proper vertical plane, but is in incorrect numerical order.

Perversion—An impacted tooth lying in an abnormal plane.

Deformity of the jaws to be used in reference to extreme malformations and maldevelopments.

Macromandibular deformity—A mandible which is too large.

Micromandibular deformity—A mandible which is too small.

Macromaxillary deformity—A maxillary which is too large.

Micromaxillary deformity—A maxillary which is too small.

Orthodontia to be used for the practice.

Orthodontics to be used for the science.

Orthodontic to be used for the adjective.

Orthodontist—One who practices orthodontia.

These terms were presented to the society in open meeting and adopted.—*Dental Items of Interest.*

KCNS in Tobacco.—We were recently informed that the greater amount of sulfocyanates in the saliva of smokers was due to the presence of salts of HCNS in the tobacco used. As this was contrary to our preconceived notion that the excess of sulfocyanate was due to increased stimulation of the salivary glands, we have spent a little time in studying the subject. Tobacco contains, according to published analyses, various acids, among which are acetic, butyric, propionic, and valerianic acids, creasote, and traces of caproic, caprylic, and succinic acids, but no mention is made of sulfocyanic acid. One or two samples of pure tobacco leaf and twelve samples of the manufactured article were tested for the presence of HCNS by extracting the sample with hot water acidulated with hydrochloric acid, then adding ferric chlorid, and shaking out the ferric sulfocyanate with ether. Results were negative in every case, and we are led to conclude that sulfocyanate is not present in tobacco, at least beyond the limits of the test, which Dr. McDonald has shown to be .012 per cent. (See DENTAL COSMOS 1912, page 59.) In making these tests, we have of course decomposed by HCl to a sufficient extent to admit of the formation of ferric sulphocyanate. If HCNS exists in tobacco in some insoluble organic combination not affected by hydrochloric acid or ferric chlorid it is hardly probable it would find its way into the saliva from this source. We have further demonstrated that a degree of heat sufficient to char the organic matter of the tobacco will decompose salts of HCNS. If this is true in a crucible, why not in the bowl of a pipe? —*Proc. Harriet Newell Lowell Society for Dental Research.*

The Hall Method of Making Impressions.—The tray having been made, the steps in taking the impression are as follows: A thin mix of plaster (ordinary impression plaster) is made by taking an excess of water in the plaster bowl, accelerated with sodium chlorid or potassium sulfate, and the plaster sifted in with a small sifter. The plaster passes through the water, and settles to the bottom of the bowl. When, according to your judgment, enough plaster has been sifted in for the impression, decant the excess water, and the plaster in the bottom of the bowl will need the spatula passed through it only two or three times to form a uniform thin mix. This thin plaster is poured into the tray until it is running over, to get the periphery well covered; then the excess is poured out, as it is not necessary to put such an excess of plaster in the mouth, since the tray practically fits the mouth. The tray with the small amount of thin plaster is now placed in the mouth, and with a slight rotary motion slowly and gradually worked to its seat. The tray should be held there with the finger, as it will in many instances become displaced if left for the patient to retain. Many operators use a thicker mix of cast-plaster and do not work the impression up entirely to place, but this procedure deprives us of one advantage which goes a long way toward making the impression a success, viz, compression of the posterior part of the palate. Unless the plaster in this region has the support of the tray to hold it in position, the more or less spasmodic action of the vibrating soft palate will work it down, and prevent pressing contact of the plate, a condition which renders the latter a failure.

When removed from the mouth after the first attempt with plaster, the impression will show in many places on the periphery that the tissues were drawn taut across the margin of the tray, displacing the plaster and exposing the tray. This indicates that the tray displaced the tissues too much in those regions, and should be trimmed off, so that the same condition will not result after the second attempt.

The palatal portion of the impression may appear thin and flaky, which indicates that pressure was greater in some places than others, and displaced the plaster accordingly. However, these places do not have to be trimmed or scraped, as that will be taken care of in the next step.

After the excessive peripheral extension is trimmed off we are ready for the next procedure. The first impression is soaked in water so that a second mix will adhere. The second mix, made the same as the first, is poured into the impression, filling it, and pouring off most of the excess, then the tray is carried to place. The mix of plaster should always be made as described in order to get the same smooth, uniform mix, of practically the same consistence, each time.

In trying to remove these impressions it will be found to be a very difficult task. To accomplish this place the forefinger in the palatal region and the thumb above the impression in the canine region on the left side, and press in on the tissue above the impression. This will loosen the impression, and permit it to be removed easily.

When removed from the mouth the second time, the impression should show regular and uniform reproduction of the area to be covered with the denture. The plaster should not be displaced, exposing the compound on the margins; if it does there is still too much displacement of tissues, and the process should be repeated. With a little practice and ordinary care, however, the second attempt with the plaster gives satisfactory results. We are quite sure now that we have the posterior palatal compression, since in each effort we had the soft plaster in small quantity supported by a firm surface.

When an impression is taken in this manner it can be clearly seen that as much peripheral extension may be produced in the denture as we have in the impression, facial contour being the only limit. And I dare say that if proper care is used in not crowding the space where the ramus of the mandible passes the tuberosities, there will be absolutely no trimming necessary on the margins of the denture.—E. B. Owen, *Dental Summary.*

OBITUARY

Dr. James Beall Morrison.

[SEE FRONTISPIECE.]

DIED, of paralysis at Kansas City, Mo., December 22, 1917, in his eighty-ninth year, Dr JAMES BEALL MORRISON.

Dr. Morrison, the son of John Rickey Morrison and Sarah Hammond Morrison, was born December 5, 1829, at East Springfield, Ohio, in the public schools of which city he received his early education, which was supplemented by short terms at Jefferson College, in his native state.

About 1848 he began the study of dentistry in the office of Drs. Esterly and Sempler at Steubenville, Ohio, and continued his studies later with Dr. Hullihen of Wheeling, W. Va. It was doubtless the strongly mechanical bent of his mind that in the first place directed his attention to the practice of dentistry as a profession, and which later, with his highly developed inventive faculty, concentrated attention upon the improvements which he later brought out in various features of dental mechanism, the most prominent and best known of which was the dental engine bearing his name. His mechanical tendencies were doubtless to a degree inherited, his father having been a wagonbuilder and manufacturer of agricultural implements, and an uncle a watchmaker. It was in the shops of both of these that the subject of this sketch in his earlier days found opportuntiy for the practical training in handicraft which enabled him to personally make many of the tools and instruments which he needed and used in his dental practice. It was the facility thus gained in the working of gold and other materials that gained for him association with Drs. Esterly and Sempler in their dental laboratories, which association a year later took the form of a partnership with Dr. Esterly, and together they traveled among the neighboring towns practicing dentistry, as was the custom in many localities at that early period of dental professional development.

At this same period it was also customary among practitioners of dentistry to submit specimens of their prosthetic work in competition on points of excellence at public exhibitions, and in conformity to that custom Dr. Morrison exhibited before the Ohio State Board of Agriculture in 1852 a specimen denture which was awarded a first prize. Incidentally, as a further illustration of this early custom, it may be noted that it was the exhibition of gold fillings made by the late Dr. Thomas W. Evans at the Franklin Institute Exhibition in Philadelphia in 1847 which attracted the attention of a friend and patient of Dr. C. Starr Brewster, an American dentist then practicing in Paris, through whose instrumentality Dr. Evans was led to go to that city, where he formed a partnership with Dr. Brewster, and thus entered upon his eminently successful career.

In 1857 Dr. Morrison went to St. Louis, where he engaged in practice with his younger brother, Dr. William N. Morrison, until 1861 or 1862, when he went abroad, practicing dentistry in Paris for a year or more with the late Dr. H. J. McKellops of St. Louis, at that time located in Paris, afterward practicing for about six years in London, where he was associated for a time with the late Mr. John Tomes and with Dr. Circombe.

The most notable contributions to dental practice made by Dr. Morrison were his developments of the dental engine and his improved dental operating chair. In August 1870 Dr. Morrison was granted a patent for his bracket engine, a device consisting of a movable arm carrying a handpiece, the combination being actuated either by foot power or other force of energy transmitted to the movable arm through a belt and pulley. The bracket engine was followed by the foot engine, for which a patent was granted to him February 7, 1871. This engine was manufactured and placed upon the market by Johnson Bros. in 1872, the first one being sold at a dental convention held in Binghamton, N. Y., April 17, 1872. Dr. Morrison's inven-

tion of the dental engine thus antedates the invention of Dr. G. V. Black's "Dentist's Helper," a form of dental engine patented by him in August 1871.

Dr. Morrison's improved dental chair was patented in 1887, and was the first chair offered to the dental profession which had provision for a wide range of movement. Previous to the introduction of the Morrison chair by Johnson Bros. the dental operating chair was merely a modification of the barber's chair of that period, and represented by the Perkins, Whitcombe, and Harris types of operating chair.

The Morrison engine was the pioneer of power-driven dental tools, and while in its original form it has been entirely superseded by later and improved designs, to Dr. Morrison belongs the credit of having first demonstrated the practicability of the so-called dental engine. His chair, even though it has been largely superseded by more elaborate mechanisms, is still in use to a considerable extent. If he who causes two blades of grass to grow where but one grew before is entitled to be regarded as a benefactor of his race, surely the impulse given to greater efficiency and more precise technique in dental operations conferred upon the dental profession through the genius of Dr. Morrison clearly entitled him to be regarded as one of the benefactors of our profession, and these data are here recorded that those who are now enjoying the benefits of his inventive talent may not fail to remember to whom the credit is due.

Dr. Morrison was a typical example of that type of practically self-educated, ambitious, and forceful pioneer dental practitioner who so notably contributed to the making of modern dentistry. The type is fast disappearing, a type characterized by a highly developed resourcefulness arising from the urgency of necessity for the creation of means adapted to the ends of dental practice which the present generation of dental practitioners, having at command the elaborate and highly developed armamentarium of modern times, has no occasion to realize.

Dr. Morrison in the later years of his life lived quietly in his home in the midst of his domestic interests. His occasional presence at a dental meeting was his only contact with the dental profession. He was an honorary member of the Missouri State Dental Society.

On October 23, 1883, he was married at Brunswick, Mo., to Emma Maude Johnson, who with two daughters survives him. His remains were interred at Mt. Washington Cemetery, Kansas City, Mo., December 23, 1917.

Dr. John W. David.

Died, December 29, 1917, at St. Paul Sanitarium, Dallas, Texas, in his fifty-fourth year, John W. David, D.D.S.

Dr. David, whose death resulted from anasarca together with a nephritis from which he had been a sufferer for several years past, was born at David's Mill, Freestone county, Texas, March 2, 1864. His parents were William and Sarah Carter David, the father being an extensive farmer and miller.

After receiving his elementary education in the schools of Fairfield and Mexia he entered the Baltimore College of Dental Surgery, from which institution he was graduated in 1891, and won the prize for excellence in operative dentistry.

Dr. David joined the Texas State Dental Association at Waco during the same year, and took pride in the fact that he had never missed attendance at an annual meeting of his state dental association. In 1900 he served as president of the Texas State Association. He also held membership in the Southern Dental Association, National Dental Association, Dallas County Dental Society, Navarro County Medical Society, American Medical Association, and was a member of the Committee of Organization in charge of the Fourth International Dental Congress held at St. Louis, Mo., in 1904. During his whole professional career Dr. David was an active participant in the work of the several societies with which he was connected, and was one of the guiding forces not only in his state, but throughout the South, where he exerted a continuous influence in the placing of American dentistry upon a sound professional basis.

Dr. David possessed in a high degree the essential qualities that make for leadership. His magnetic personality owed its charm to his love of the truth and to the unquestioned

moral courage that he displayed upon all occasions as the defender of the principles for which he stood. He was the protagonist of the best ideals in his profession, and the exponent of a noble and virile American manhood. To his host of friends he was a continual source of inspiration. He was the enemy of no man, but an uncompromising antagonist of all that was mean, petty, or selfish. The dental profession has lost by the death of Dr. David one of its best exponents, one of its most trusted leaders, and all of his friends a comrade whose friendship has been a lasting benediction. His remains were interred with Masonic ceremonial at Corsicana, Texas, on December 31, 1917. He is survived by a widow, two sons, and a daughter.

DR. JOHN W. DAVID.

Death of Dr. John R. Callahan.

We regret to announce the death of Dr. John R. Callahan of Cincinnati, from apoplexy, on Wednesday, February 13th. A full obituary notice of Dr. Callahan will appear in a later issue of the Dental Cosmos.

ARMY AND NAVY DENTAL NEWS

Proposed Legislation for the Navy Dental Corps.

THE National Dental Association, at the New York meeting, approved legislation placing the Navy Dental Corps on an equal status with the Naval Medical Corps, similar to the conditions existing between these two corps in the army, as enacted by Congress October 6, 1917. The Legislative Committee was instructed to promote this approved legislation at such a time and under such conditions as would seem most favorable. In this connection, and in view of some of the conflicting and discouraging reports regarding what was secured through the Army Dental Corps legislation, it was deemed advisable to wait for this to be officially interpreted before starting legislation for the Navy Corps. This has just been interpreted to our entire satisfaction, which prompts us to follow the phraseology and general plan of procedure of the Army Corps legislation. Therefore, the following bill was introduced January 5, 1918, by Senator Lodge:

[No. 3386.]

A BILL

TO PROVIDE FOR COMMISSIONED OFFICERS OF THE DENTAL CORPS OF THE NAVY THE SAME RANK, PAY, PROMOTIONS, AND ALLOWANCES AS OFFICERS OF CORRESPONDING GRADES IN THE NAVAL MEDICAL CORPS, AND FOR OTHER PURPOSES.

Be in enacted by the Senate and House of Representatives of the United States of America in Congress assembled:

That the Dental Corps of the Navy shall consist of commissioned officers of the same grades and proportionally distributed among such grades as are now or may be hereafter provided by law for the Medical Corps, who shall have the rank, pay, promotions, and allowances of officers of corresponding grades in the Medical Corps, including the right to retirement as in the case of other officers, and there shall be one dental officer for every thousand of the total strength of the Navy and Marine Corps authorized from time to time by law: *Provided*, That dental examining boards shall consist of one officer of the Medical Corps and two officers of the Dental Corps: *Provided further*, That immediately following the approval of this act all members of the Dental Corps now in active service shall be recommissioned in the Dental Corps in the grades herein authorized in the order of their seniority and without loss of pay, rank, allowances, or precedence in the navy: *And provided further*, That nothing in this act shall be construed as in any way affecting the original appointment of officers to the Dental Corps as provided in the "Act approved August twenty-ninth, nineteen hundred and sixteen, making appropriations for the naval service for the fiscal year ending June thirtieth, nineteen hundred and seventeen, and for other purposes": *And provided further*, That when ordered to active duty, officers of the Dental Reserve Corps shall receive promotion in rank under the same relative conditions and provisions of active service as provided in this act for the Navy Dental Corps.

It should be distinctly understood that this legislation is entitled to and should receive the liberal support of the profession generally.

To that end we especially and respectfully request that THE OFFICERS OF ALL DENTAL SOCIETIES PROMPTLY WRITE THEIR SENATORS AND REPRESENTATIVES INDORSING THIS LEGISLATION AND SOLICITING THEIR SUPPORT. It is assumed that all dental societies at some time have indorsed this general legislative program, and it is therefore suggested that official stationery be used in writing, and that you be specific in stating that you express the views of your society. Individual letters are very necessary, especially from those who professionally serve or are acquainted with their senators and representatives; and further, it

is very important that the merits of this legislation be most favorably presented to the members of both the Senate and the House Naval Affairs Committees, as committee support is an essential requisite. (A list of these committees is hereinafter incorporated.) In these letters it can very properly be stated that this proposed legislation is in exact harmony with what was enacted by Congress October 6, 1917, for the Army Dental Corps, and as a question of justice the same conditions should be provided for the two branches of the service.

This appeal demands your prompt attention, and it will be appreciated if you will please forward to me such replies as are distinctly favorable or unfavorable, as this makes it possible to keep in touch with the situation in an advantageous way.

The following is a list of the committees above mentioned as published in the Congressional Directory, April 1917:

SENATE NAVAL AFFAIRS COMMITTEE.

BENJ. R. TILLMAN of South Carolina.
CLAUDE A. SWANSON of Virginia.
JOHN WALTER SMITH of Maryland.
JAS. HAMILTON LEWIS of Illinois.
JAMES D. PHELAN of California.
KEY PITTMAN of Nevada.
THOMAS J. WALSH of Montana.
ROBERT F. BROUSSARD of Louisiana.
PETER G. GERRY of Rhode Island.
PARK TRAMMELL of Florida.
BOIES PENROSE of Pennsylvania.
HENRY CABOT LODGE of Massachusetts.
WILLIAM ALDEN SMITH of Michigan.
CARROLL S. PAGE of Vermont.
MILES POINDEXTER of Washington.
WARREN G. HARDING of Ohio.
FREDERICK HALE of Maine.

HOUSE NAVAL AFFAIRS COMMITTEE.

LEMUEL P. PADGETT of Tennessee.
J. FRED C. TALBOT of Maryland.
ALBERT ESTOPINAL of Louisiana.
DANIEL J. RIORDAN of New York.
WALTER L. HENSLEY of Missouri.
JOHN R. CONNELLY of Kansas.
WILLIAM B. OLIVER of Alabama.
WILLIAM W. VENABLE of Mississippi.
CARL VINSON of Georgia.
ADAM B. LITTLEPAGE of W. Virginia.
JAMES C. WILSON of Texas.
THOMAS S. BUTLER of Pennsylvania.
WILLIAM J. BROWNING of New Jersey.
JOHN R. FARR of Pennsylvania.
FRED A. BRITTEN of Illinois.
PATRICK H. KELLEY of Michigan.
SYDNEY R. MUDD of Maryland.

INTERPRETATION OF ARMY DENTAL CORPS LEGISLATION.

Members of the dental profession will probably be interested in knowing that the legislation enacted October 6, 1917, has finally been satisfactorily interpreted, and that the members of the regular Army Dental Corps have received their promotion, subject to the required examination incident to promotion. This interpretation gives us all for which we have contended, and harmonizes very accurately with the views presented in our report at the New York meeting. In this report we incorporated the estimates of the *Army and Navy Register* relative to the number in the various grades, but those figures were understated, since we get 12 colonels instead of 9, 20 lieut.-colonels instead of 16, and 87 majors instead of 71. In addition there will be something more than 100 first lieutenants, of which a proportionate number will be promoted to the grade of captain as soon as they have completed one year's service. This promotion on the basis of one year's service is the result of the emergency legislation for the term of the war, and was authorized by the provisions of H. R. 4897, to which bill we offered our dental amendment. In view of the fact that the Dental Corps is placed on an exact status with the Medical Corps, our corps naturally gets the benefit of this emergency legislation.

While no specific mention was made of the Dental Reserve corps in our recent legislation, my contention has always been that the

legislation for the regular corps automatically provided the authority for the necessary modification of the regulation relative to the Officers' Reserve corps to place the Dental Reserve corps on an equal status with the Medical Reserve corps. This position has been thoroughly verified by the official interpretation, and in the future whatever applies to the Medical Reserve corps will apply in like manner to the Dental Reserve corps.

In connection with this legislation I received hundreds of congratulatory messages, consisting of letters, resolutions, telegrams, and cablegrams. These were received at a time when it was impossible to give them anything like the prompt individual attention they merited. Then followed weeks of conflicting reports, but now that this matter has been officially and satisfactorily interpreted, I take this belated and public method of kindly thanking all for their generous expressions.

Fraternally,

HOMER C. BROWN, *Chairman,*
Legislative Committee, N. D. A.

609 Hartman Bldg., Columbus, Ohio.

[We are informed that the above bill in its present form does not fully meet the requirements of the Navy Department, and that other legislation involving the principle of equality of status for the Medical and Dental corps is under consideration.—ED.]

Physical Examination of Registrants in the Army.

REVISION OF THE DENTAL REQUIREMENTS.

On the recommendation of the Surgeon-general, a board consisting of Col. George E. Bushnell, U. S. Army, retired; Lieut.-cols. Thomas L. Rhoade and Philip W. Huntington, M.C.; Majors Pearce Bailey, Joseph C. Bloodgood, Elliot C. Brackett, William H. Logan, Warfield R. Longcope, Walter R. Parker, and Charles W. Richardson, M.R.C.; Contract Surg. Henry H. Morton, U. S. Army—alternate, Contract Surg. William A. Pusey, U. S. Army—was appointed to revise that section of the selective service regulations governing the physical examination of registrants. As a result of the deliberations of the board many changes have been made in the regulations. They consist chiefly of defining certain standards for unconditional acceptance or unconditional rejection by the local boards. One of the chief reasons for defining such standards is that the selective service law permits the acceptance of registrants for special duties. These registrants who have not the physical qualifications for general military service may be otherwise physically and mentally qualified for special military service. Under the new regulations, physicians of the local boards are not required to make a complete examination of every registrant before rejection. They are required to make a complete physical examination before unconditional acceptance, and even then the registrant may appeal to the medical advisory board for a second examination. The result of the new regulations is practically to throw the large burden of the examinations on the medical advisory boards. In other words, the wholly normal or markedly abnormal, which constitute the smallest number of men in general, come within the purview of final action by the local board. All others are referred to the medical advisory boards.

The section relating to dental requirements as revised is as follows:

SECTION 185—*Dental requirements.*

Accept registrants who have three serviceable natural masticating teeth above and three below opposing, and three serviceable natural incisors above and three below opposing. All these teeth must be so opposed as to serve the purpose of incision and mastication. Therefore the registrant shall have a minimum total of six masticating teeth and a minimum total of six incisor teeth.

The needed dental treatment will be performed at the cantonment. However, if time permits, a registrant, if he prefers, may have the necessary work done at home previous to his induction into military service.

Definitions. (*a*) The term "masticating teeth" includes molar and bicuspid teeth, and the term "incisors" includes incisor and cuspid teeth.

(*b*) A natural tooth which is carious (one with a cavity), which can be restored by filling, is to be considered as a natural serviceable tooth.

(*c*) Teeth which are restored by crowns or dummies attached to fixed bridge work, when well placed, shall be considered as serviceable natural teeth, when the history and the appearance of these teeth is such as to clearly warrant such assumption.

(*d*) A tooth is not to be considered a serviceable natural tooth when it is involved with excessively deep pyorrhea pockets, or when its root-end is involved with a known infec-

tion that has or has not an evacuating sinus discharging through the mucous membrane or skin.

Refer all other cases to the medical advisory board.

No registrants can be rejected on account of teeth defects.

—From *Journ. Amer. Med. Association.*

Dental Officers' Promotions.

RESERVE CORPS.

IN accordance with orders issued some days ago, boards of officers are in session for the examination of members of the dental corps of the regular army who have had at least one year's service, to the grades of colonel, lieutenant-colonel, and major, as authorized by recent legislation. Now that these preliminary arrangements for advancement of members of the regular corps are out of the way, the matter of promotion in the dental reserve corps has been taken up, and the Surgeon-general has directed chief surgeons of divisions and departments and of the troops in France to make recommendations as to those reserve dentists of their organizations that they consider to merit advancement in rank. For the present no dental reservist will be considered for promotion unless he has been in the actual practice of dentistry for at least three years, and later none of less experience will be considered until after completion of one year's service in the military establishment during the present war. Moreover, dental reservists not on active duty will not be considered for promotion. The dental reserve corps will have the same grades as the medical reserve corps, that is, the personnel will be distributed among the grades of major, captain, and first lieutenant, those on active duty being distributed in the grades in the same proportion as in the medical branch. Thus not more than about 32 per cent. may be in the grade of major, and the remainder in the grades of captain and first lieutenant, but it is not intended completely to fill the grade of major immediately. Accordingly, of the 1500 dental reservists on active duty not more than about 484 of them may be advanced to the grade of major.—*Army and Navy Register.*

Medical Corps Instruction Extended.

IN order to equip officers and men in the special work required of the Medical corps and its sanitary, dental, and veterinary branches, extensions are being arranged for medical camps at Fort Oglethorpe, Ga., and Fort Riley, Kan. There are at present 5400 officers and men under training at Fort Oglethorpe, and 3800 at Fort Riley. Fort Riley has a capacity of 7000. Enlargement of the school at Fort Oglethorpe to the same capacity has been authorized, its present capacity being 5500. There have been graduated from medical training camps since June 1st, or are now under instruction, a total of about 9000 officers and about 20,000 enlisted men. The medical training camp at Fort Benjamin Harrison, Ind., and the one at Fort Des Moines, Iowa, for colored officers and men, which contributed to the total, have been discontinued.—*Journ. of the Amer. Med. Association.*

Army Dental Corps.

EXAMINATIONS are still in progress for the determination of the fitness for promotion of officers of the regular dental corps of the army. These examinations began on December 15th in Washington and other places. Some fifteen or sixteen officers of the corps who are on duty in the Eastern, Northeastern, and a part of the Southeastern Department have been examined in Washington.

NEW APPOINTMENTS (JANUARY 21ST).

To be FIRST LIEUTENANTS: J. G. Urban, C. S. Emmert, W. H. Siefert, S. J. Lewis, J. H. O'Reilly, F. W. Miller, J. A. Curtis, Jr., J. J. Weeks, J. L. Davis, J. H. Jaffer, A. A. Meyer, H. C. Feyler, W. F. Scheumann, A. G. McCue, Jr., C. H. Glascock, A. F. Roberts, J. N. White, H. L. Sams, G. M. Krough, W. W. Woolley, E. W. Barr, F. E. Rodriguez, W. F. Wieck, T. H. Veale, L. J. Dunn, C. R. Oman, L. A. Gould, H. A. Curtis.

APPOINTMENTS—RESERVE CORPS (FEBRUARY 2D).

To be FIRST LIEUTENANTS: Lee G. Lourie, Benjamin Feldman, Frank Cabul Bettencourt, Gordon Alden Billings, Rollo Hestwood Cheney, James S. Dailey, Joseph Hyrum Davis, Chas. Lawrence Drain, John H. Gatterdam, Roy Stuart Glass, Edmund T. Glessner, William E. Goepper, Wm. H. Hanford, Fred O. Hoedt, Benjamin F. Loveall, Francis J. McDonald, Walter L. McNamara, Thomas J. Meador, Charles W. Noel, John N. Schwab, Saxon Bird Scott, John L. Shaw, Horace I. Spare, Leo Appleton Stafford, Benjamin Bryant Todd, Sherman Aloysius White, Albert Perry Williams, George M. Boehler, Francis V. Simonton, Alvin W. Viney, Samuel S. Sharfman, Maitland V. Shaver, Arthur J. Brennan, Irvin R. McCollough, Jos. Schlund Clark, Geo. A. Bender, Geo. A. Bullard, Wm. Clinton Clayton, Gordon Chappuie, Christopher C. Vaughan, Jr., Chas. E. Wach, Karan Mack Yokeley, Henry Marshall, Harry

Finkel, John Augustus Kimball, Frank Sylvester Heer, Frank C. McAuley.

ADVANCEMENTS IN RANK—ARMY DENTAL CORPS (JANUARY 26TH).

Under provisions of an act of October 6, 1917, advancement in rank of the following dental surgeons is announced.

To be COLONELS—with rank from October 6, 1917: Robert T. Oliver, S. Davis Boak, Franklin F. Wing, Geo. L. Mason, Frank H. Wolven, John H. Hess, William H. Chambers, Alden Carpenter, Edwin P. Tignor, John A. McAlister, Jr., Geo. H. Casaday, and Julien R. Bernheim.

To be LIEUTENANT-COLONELS—with rank from October 6, 1917: Rex H. Rhoades, George E. Stallman, George I. Gunckel, Frank P. Stone, Raymond E. Ingalls, Harold O. Scott, John R. Ames, Robert H. Mills, Frank L. K. Laflamme, Minot E. Scott, George D. Graham, Robert F. Patterson, Samuel H. Leslie, Albert R. White, Mortimer Sanderson, John H. Snapp, Wm. A. Squires, Arnett P. Matthews, John W. Scovel, Charles DeW. Deyton.

To be MAJORS—with rank from October 6, 1917: Benj. C. Warfield, Herman S. Rush, Lester C. Ogg, Harry M. Deiber, Lowell B. Wright, Walter L. Reesman, Jas. G. Morningstar, Eugene Milburn, Claudius G. Baker, Samuel J. Randall, Chas. Taintor, Don G. Moore, Oscar G. Skelton, Harlan L. Thompson, Robt. B. Tobias, Harry C. Peavey, Wm. S. Rice, Emmett P. Varvel, J. Craig King, Leigh C. Fairbank, Chas. C. Mann, Richard B. Clark, Dale E. Repp, Terry P. Bull, Raymond W. Pearson, A. J. Skillman, Donald W. Forbes, James L. P. Irwin, Thomas C. Daniels, Ben H. Sherrard, Fred'k R. Wunderlich, Wilfurth Hellman, Bruce H. Roberts, Samuel Kaufman, Lee S. Fountain, John L. Schock, Chas. W. Lewis, Gerald D. Byrne, E. Henry Valentine, Oscar P. Snyder, Wm. Mann, Jos. H. Tyler, Rex McK. McDowell, Chas. M. Taylor, Thos. L. Smith, Elbert E. Rushing, Earp T. Dickmann, Walter S. Smith, Brantley I. Newsom, George R. Tressel, Lee B. Schrader, Frederic H. Bockoven, Aaron F. Eidenmiller, and Howard L. Benedict.

Assignments.

Army Dental Corps.

Week ending January 19th.

1st Lieut. Wm. A. Moore from duty at Fort Riley to Fort Bliss, Tex., for duty with 18th field artillery.

1st Lieut. Chas. H. Brammell from duty at Fort Riley to Douglas, Ariz., 10th field artillery, for duty.

1st Lieut. Milton A. Price from present duties and assigned with aviation section, Greenville, S. C., Camp Sevier.

The following from duty in Panama Canal department to United States and report for orders: 1st Lieuts. Chas. C. Mann and A. J. Skillman.

The following from duty at Camp Lewis, Wash., to San Francisco, Cal., to Philippine Islands for duty: 1st Lieuts. John C. Campbell and Leland S. Wilson.

Week ending January 26th.

1st Lieut. Clement J. Gaynor from duty at Camp Funston, Kan., to Jefferson Barracks for duty.

Col. Wm. H. Chambers from duty at Presidio of San Francisco, and report to commanding general, Western department, for assignment to duty.

Week ending February 2d.

Col. Julien R. Bernheim from present duties to duty in office of attending surgeon, Washington, and in addition to that duty is placed in charge of dental service of District of Columbia, exclusive of Walter Reed General Hospital.

1st Lieut. Wm. A. Moore from duty at Fort Bliss to Fort Bayard, general hospital, for duty.

Week ending February 9th.

Leave for sixty days is granted Lieut.-col. Geo. I. Gunckel on account of sickness.

Camp Pike Dental Society.

ON January 8, 1918, the Dental Surgeons of Camp Pike organized a society, naming it "Camp Pike Dental Society." Col. John H. Hess, D.C., the division dental surgeon, was elected honorary president; 1st Lieut. Edgar T. Blocher, D.R.C., president; 1st Lieut. Henry W. Rich, D.R.C., vice-president; 1st Lieut. George H. Elliott, D.R.C., sec'y-treasurer.

The object of the society is to increase the efficiency of the dental corps, bringing the members closer together, to broaden their knowledge along certain specific lines, mainly that of oral and war surgery. The meetings are held Tuesday evening of each week.

GEORGE H. ELLIOTT, *Sec'y-Treasurer.*

Preparedness League of American Dentists.

(Organized under the auspices of the N. D. A.)

The Dental Committee of the General Medical Board, which is the agency for the Medical and Dental Preparedness in this War-emergency has made it possible for every Dentist in the United States to assist in the work, under the supervision of Lieut. Wm. A. Heckard, D.R.C., U.S.A., stationed at 50 East 42d st., New York, N. Y.

Circular from Director-general Dr. Chas. F. Ash.

You are called to SERVE YOUR COUNTRY.

If the President of the United States called on you personally and asked you to give to our soldiers and sailors at least one hour of free dental service each day, would you give it? Of course you would. He cannot call on you personally, but this is his personal appeal to you.

The President of the United States is asking you—You, my dear Doctor, to give your service to *help win the war.* Your part of the work must be done by *you.* No one else can do it. Every other dentist will be busy doing *his* bit. He can't do *yours.* The ships are needed to carry the fighting men and supplies. Only one dentist to every 1000 men can be taken abroad.

If we fill all the cavities and extract all the diseased teeth before our boys go to the cantonments, it will still leave more work than one dentist can do to take care of the emergencies for 1000 men.

Up to date we have a record of 136,000 operations performed, but thousands of men of our new national army have gone away without proper dental service. This must not continue. It's up to you and me to see that this is not repeated in the future drafts.

If this work is not done it will mean *sleepless nights* for those wounded or stricken by disease.

It will mean *tripling the cost* of maintaining a man for every day he spends in the hospital.

It will mean *decreasing the efficiency* of our army and navy.

Tooth troubles are accentuated in the trenches. Would you wilfully add the horrors of abscessed teeth to the burden of injury and disease which our boys must bear?

These boys are sacrificing their home ties, many of them their limbs, and many others their lives. You are asked to sacrifice a little of your time and material each day in safe quarters with comfortable surroundings. Let us show some red blood in our veins by making this insignificant sacrifice.

Have you ever said out loud, "This is MY *war"? Try it now—say aloud, "This is* MY *war"!*

Circular from Lieut. Wm. A. Heckard.

(Detailed by the Surgeon-general's Office.)

50 EAST 42D ST., NEW YORK CITY,
January 18, 1918.

We are engaged in war. Many of our men are now in France and many more are soon to go. It has been reported that the Germans are massing 2,000,000 more men on the French front.

The French General tells us: "Equip yourselves as if the war were going to last ten years, but 'speed up' as if it were going to end in six months."

The President of the United States has said that every utility should be conserved and used in the great war. Dentistry is certainly a utility of the highest order. The following is quoted from two of the President's statements:

"Let us show ourselves Americans by show-

ing that we do not want to go off in separate camps or groups by ourselves, but that we want to co-operate with all other classes and all other groups in a common enterprise, which is to release the spirits of the world from bondage. . . . I will call upon all the citizens to assist local and district boards by proffering such services and such material convenience as they can offer."

Dentists have already rendered a very valuable service in performing 136,000 free dental operations—furnishing the material free, for men now in service.

Since the United States entered the war, dentistry has received additional recognition of the place it occupies among the great professions. Dentists now stand side by side with medical men and lawyers who are giving many hours of the day free to the selective service men.

A law was passed in Washington, October 6th, and signed by the President, giving dentists in the army and navy equal rank, pay, promotion, and allowances of officers of corresponding grades in the Medical corps. Same exemption of dental students as medical students. Governors have appointed dentists to serve on the medical advisory boards and exemption boards to pass on dental questions.

The dental profession is now organized to do its share of the work of speeding up preparation, and there is much yet it will have to do if it expects to maintain its newly achieved recognition.

"Under the law only one dentist per thousand is permitted in the army. One dentist to a thousand is insufficient to care for the dental needs of the new army before it is ordered to foreign service." The Government may not recognize any special league or sets of men, but the General Medical Board, which is the agency for the medical and dental preparedness in this war emergency, through the Dental Committee, has made it possible for the dental profession to assist in this work, under the direction of the Surgeon-general's Office, and under the direct supervision of Lieut. Wm. A. Heckard, D.R.C., on active duty stationed at New York City.

We have, therefore, taken part and helped in the adoption of the military plan for organizing the Preparedness League of American Dentists, and mobilizing free dental activities, so as to simplify details and cut expense.

The French said "They shall not pass!" Let it not be said that we permitted our soldiers and sailors to leave home until dentally fit; so that when the time comes for them to "pass"—and pass they will—none will miss his chance by reason of toothache or swollen face, or worse yet, endocarditis and rheumatism from focal infection. Get in touch with your state director. Help with the job. Don't complain—help him. He may have bumps as big as yours to get over.

The Dental Committee of the General Medical Board, co-operating with the Preparedness League of American Dentists.

LIEUT. W. A. HECKARD, D.R.C.,
Detailed by the Surgeon-general's Office.

"Hurry!" was the message brought back from France by Colonel House.

Preparedness League Notes and News.

By R. OTTOLENGUI, *Publicity Committee.*

NEW MEMBERS.

The treasurer, Dr. L. M. Waugh, reports a most satisfactory response to the circular letter recently sent out as a means of recruiting members. A careful tabulation has shown that prior to January 1, 1918, there were, in round numbers, 5700 members of the League. Up to February 1st, in response to the circular letter above mentioned, 4900 new members have been enrolled, and Dr. Waugh reports that applications for membership have come in so rapidly—about a hundred a day—that as yet it has been impossible to classify them by states. This will be reported next month.

THE LEAGUE BUTTON.

By a recently made rule, the buttons are to be sent to new members without extra charge. (Old members can get the button for 25c.) Therefore, members will please do two things: Get your button; *wear your button.* You are asked to wear it, not to advertise yourself, nor the League, but we want to make the man without a button conspicuous.

In France, within thirty days after the beginning of the war, all persons serving the Government—soldiers, hostlers, drivers, railroad men, and labor of all kinds, skilled or unskilled—wore armbands reading, "Military Service." Men without bands became very conspicuous, and received scant consideration from the "Women of France." Wear your League button!

All dentists who have not yet filled out Form 3A are requested to do so at once and mail the same to Lieut. Heckard.

DENTAL ANESTHETISTS WANTED.

My dear Dr. Ash,—I am just in receipt of one of your circulars of the Preparedness League of American Dentists, and would sign up and return cards only I am a physician and surgeon, and I am furthermore disabled with arthritis from actively participating in your efforts.

However, despite my disability and the limitations of a wheel-chair, I am co-operating with the Surgeon-general and Council of National Defense in recruiting expert anesthetists for immediate service at the front in the base hospitals and casualty clearing stations.

In this recruiting we have not drawn any lines between the surgical and dental anesthetist, believing that both are fully competent for this service. The Interstate Association of Anesthetists, of which I am secretary, has welded the interests of the medical and dental professions so thoroughly that recently in Ohio our Attorney-general, in an opinion, delegated equal privileges to medical and dental anesthetists. We are anxious to have the verdict of the war hospitals indorse this amalgamation.

It has been with some difficulty that we have persuaded the Surgeon-general that anesthetists, surgical and dental, are in great demand at the front. To emphasize their value Captain Gwathmey, of the Lakeside unit, which was loaned to the British army, during the attack on the Messines Ridge kept three surgeons busy and standing at the head of three tables radiating like spokes of a wheel, put 34 wounded soldiers under anesthesia during a period of five and one-half hours. Truly a record, and showing what the expert anesthetist can do in limiting the horrors of war.

The German, French, and even the English anesthetic service collapsed promptly at the outset of the war, and thousands of wounded were operated on without anesthesia, agents and administrators both being lacking. We are trying to avoid such a collapse of our surgical and dental service.

In this connection, if in your canvass you encounter any dental anesthetists who desire active service, or who will accept anesthetic service at base hospitals at home, or are competent to act as instructors, or in replacing those in hospitals who have lost staff anesthetist to active service, let me have their names and addresses, and I will see that they are given their chance of doing their bit.

Appreciating the efforts you are making and wishing you every success, I remain,

Cordially yours.

Avon Lake, Ohio. F. H. McMechan.

DENTISTS ON MEDICAL ADVISORY BOARDS.

The Government has established a new and improved system of dealing with men who claim exemption because of alleged physical defects. What are known as "medical advisory boards" have been formed, to which a man may appeal from the decision of a local exemption board, or to which the local board may refer doubtful cases. These boards, for convenience, are located mainly in conjunction with hospitals, and include high-grade and skilled medical specialists.

Dentists have likewise been appointed to all of these boards. This is a recognition by the Government undoubtedly due to the services which have been rendered by the Preparedness League.

DENTAL PERSONNEL ON THE BOARDS.

The majority of the dentists appointed on the medical advisory boards are already members of the League. However, state directors are requested to obtain the list of such appointments, and if they find thereon any who are not members of the League, a personal letter will probably induce such men to join with us.

EXEMPTIONS FOR DENTAL DEFECTS.

From early indications the dental members of the medical advisory board will have ample work to do. These boards not only examine cases of appeal, but also those cases where the local board examiners are in any doubt as to the physical disability of the registrant. The men are then classified as: "For general military service," "For limited military service," or "exempt."

There has been a disposition on the part of the local boards to shift the responsibility for the dental cases, which will be partly overcome by the presence of dentists on these boards, otherwise the present number of dentists on the advisory boards will be inadequate.

The "selective service regulations" admit of the broadest construction, and if taken literally, indicate that no man need be exempted because of defective or missing teeth.

DENTAL REQUIREMENTS.

The person must have at least eight *serviceable natural* masticating teeth, either bicuspids or molars, four above and four below opposing, and six *serviceable natural* incisors or canines, three above and three below opposing. These teeth must be so opposed as to serve the purposes of incision and mastication. There must be one molar above and one below on one side which occlude; the remaining six opposing masticating teeth may be either bicuspids or molars.

Teeth restored by crown or fixed bridge work, when such work is well placed and thoroughly serviceable, are to be considered as *serviceable natural* teeth within the meaning of the above paragraph.

A well-fitting artificial denture, plate, or removable bridge is allowed to take the place of missing teeth, providing the *serviceable natural* teeth on one side of the mouth are sufficient to meet one-half the masticating (bicuspid or molar) requirements fixed above as the minimum.

If dental work will restore the teeth so as to meet the requirements outlined in the preceding paragraphs, the man should be accepted and sent to his cantonment, where the dental work needed to bring him within the requirements will be carried out.

DIFFICULTY OF INTERPRETATION.

Observe that in one place the regulation says that well-fitting artificial teeth may take the place of natural teeth, provided that the natural teeth on one side of the mouth could sustain half the requirements of mastication. This is a litle difficult to construe, especially as artificial teeth attached on one side alone constitute a more difficult problem in construction than where attachment may be made on both sides.

The last paragraph of the regulation provides that if artificial teeth would bring the man within the requirements of the original standard he may be accepted and sent to his cantonment and the work will be done there.

Already the medical members of the advisory boards are construing this to mean that if artificial teeth can be made for a man, he may be accepted. If this be the meaning, then dental examination becomes useless, because artificial teeth can be made for practically any man.

A closer study of the requirement, however, would seem to mean that *only one-half of a man's masticating apparatus may be restored by artificial teeth.* But if this is meant, the wording of the rule is unfortunate, since it seems to require that the restoration may only occur when the deficiency is on one side, which describes the least useful type of denture.

However, this is not the place to discuss this matter. It is mentioned here merely that the League may give the question intelligent study.

ORGANIZATION OF DENTAL MEMBERS OF BOARDS.

In New York City it has been decided, unless objections are made by the authorities, to form an association of the dental members of the medical advisory boards. The first meeting will occur on February 18th. Members of the Adjutant-general's staff will be present to give the dentists instructions as to the interpretation of the regulations. The final decision on some of the ambiguous features will be published next month for the information of all League members officiating on medical advisory boards.

LOCAL EXEMPTION BOARDS.

The Government will probably appoint at least one dentist on every local exemption board in the country. If League members would serve on these boards, it would greatly facilitate the League's work, as in most cases the conscripted man could be directed at once as to where he could have his dental defects treated. Therefore directors of states are urged to scrutinize all appointments to local exemption boards, and to enroll all non-members within our ranks as rapidly as possible. It is desirable to appeal to the Adjutant-general of your state and urge him to secure nomination for these boards through the presidents and officers of local boards.

SPECIAL NOTICE.

Call for Reports of Accidents from Local Anesthetics.

THERAPEUTIC RESEARCH COMMITTEE OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION.

[From *Journal of the American Medical Association.*]

THE Committee on Therapeutic Research of the Council on Pharmacy and Chemistry of the American Medical Association has undertaken a study of the accidents following the clinical use of local anesthetics, especially those following ordinary therapeutic doses. It is hoped that this study may lead to a better understanding of the cause of such accidents and consequently to methods of avoiding them, or, at least, of treating them successfully when they occur.

It is becoming apparent that several of the local anesthetics, if not all of those in general use, are prone to cause death or symptoms of severe poisoning in a small percentage of those cases in which the dose used has been hitherto considered quite safe.

The infrequent occurrence of these accidents and their production by relatively small doses point to a peculiar hypersensitiveness on the part of those in whom the accidents occur. The data necessary for a study of these accidents are at present wholly insufficient, especially since the symptoms described in most of the cases are quite different from those commonly observed in animals even after the administration of toxic but not fatal doses.

Such accidents are seldom reported in detail in the medical literature, partly because physicians and dentists fear that they may be held to blame should they report them, partly, perhaps, because they have failed to appreciate the importance of the matter from the standpoint of the protection of the public.

It is evident that a broader view should prevail, and that physicians should be informed regarding the conditions under which such accidents occur, in order that they may be avoided. It is also evident that the best protection against such unjust accusations and the best means of preventing such accidents consist in the publication of careful detailed records when they have occurred, with the attending circumstances. These should be reported in the medical or dental journals when possible; but when, for any reason, this seems undesirable, a confidential report may be filed with Dr. R. A. Hatcher, 414 East Twenty-sixth st., New York City, who has been appointed by the committee to collect this information.

If desired, such reports will be considered strictly confidential so far as the name of the patient and that of the medical attendant are concerned, and such information will be used solely as a means of studying the problem of toxicity of this class of agents, unless permission is given to use the name.

All available facts, both public and private, should be included in these reports, but the following data are especially to be desired in those cases in which more detailed reports cannot be made:

The age, sex, and general history of the patient should be given in as great detail as possible. The state of the nervous system appears to be of especial importance. The dosage employed should be stated as accurately as possible; also the concentration of the solution employed, the site of the injection (whether intramuscular, perineural, or strictly subcutaneous), and whether applied to the mouth, nose, or other part of the body. The possibility of an injection having been made into a small vein during intramuscular injection or into the gums should be considered. In such cases the action begins almost at once, that is, within a few seconds.

The previous condition of the heart and respiration should be reported if possible, and of course the effects of the drug on the heart and respiration, as well as the duration of the symptoms, should be recorded. If antidotes are employed, their nature and dosage should be stated, together with the character and time of appearance of the effects induced by the antidotes. It is important to state whether antidotes were administered orally, or by subcutaneous, intramuscular, or intravenous in-

jection, and the concentration in which such antidotes were used.

While such detailed information, together with any other available data, are desirable, it is not to be understood that the inability to supply such details should prevent the publication of reports of poisoning, however meager the data, so long as accuracy is observed.

The committee urges on all anesthetists, surgeons, physicians, and dentists the making of such reports as a public duty; it asks that they read this appeal with special attention to the character of observations desired.

TORALD SOLLMANN, *Chairman*,
R. A. HATCHER, *Special Referee*.

SOCIETY NOTES AND ANNOUNCEMENTS

Coming Dental Society Meetings.

National.

NATIONAL DENTAL ASSOCIATION. Chicago. August 5th to 9th.

NATIONAL ASSOCIATION OF DENTAL FACULTIES. Chicago.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS. Chicago.

XI PSI PHI FRATERNITY. Chicago.

ASSOCIATION OF MILITARY DENTAL SURGEONS. Chicago.

State Meetings.

MARCH.

VERMONT STATE DENTAL SOCIETY. Burlington. March 20th to 22d.

APRIL.

ALABAMA STATE DENTAL ASSOCIATION. Montgomery. April 8th.

CONNECTICUT STATE DENTAL ASSOCIATION. New Haven. April 18th to 20th.

KANSAS STATE DENTAL SOCIETY. Topeka. April 15th to 17th.

MICHIGAN STATE DENTAL SOCIETY. Detroit. April 8th to 13th.

MISSOURI STATE DENTAL ASSOCIATION. Columbia. April 1st to 3d.

ODONTOLOGICAL SOCIETY OF WESTERN PENNSYLVANIA. Pittsburgh. April 9th and 10th.

ONTARIO DENTAL SOCIETY. Toronto. April 29th to May 2d.

PENNSYLVANIA STATE DENTAL SOCIETY. Wilkes-Barre. April 23d to 26th.

TEXAS STATE DENTAL SOCIETY. San Antonio. April 10th to 12th.

VIRGINIA STATE DENTAL ASSOCIATION. Roanoke. April 29th to May 1st.

WEST VIRGINIA STATE DENTAL SOCIETY. Huntington. April 10th to 12th.

MAY.

ILLINOIS STATE DENTAL ASSOCIATION. Bloomington. May 14th to 17th.

INDIANA STATE DENTAL SOCIETY. Indianapolis. May 21st to 23d.

IOWA STATE DENTAL SOCIETY. Des Moines. May 7th to 9th.

MISSISSIPPI STATE DENTAL SOCIETY. Meridian. May 7th.

NEBRASKA STATE DENTAL SOCIETY. Lincoln. May 20th to 23d.

JUNE.

COLORADO STATE DENTAL SOCIETY. Estes Park. June 20th to 22d.

FLORIDA STATE DENTAL SOCIETY. Atlantic Beach. June 20th to 22d.

GEORGIA STATE DENTAL SOCIETY. Atlanta. June 12th to 14th.

KENTUCKY STATE DENTAL ASSOCIATION. Lexington. June 13th to 15th.

NEW YORK STATE DENTAL SOCIETY. Saratoga Springs. June 13th to 15th.

NORTH CAROLINA DENTAL SOCIETY. Wilmington. June 19th to 21st.

SOUTH CAROLINA STATE DENTAL ASSOCIATION. Columbia. June 27th to 29th.

WYOMING STATE DENTAL SOCIETY. Thermopolis. June 10th.

JULY.

CALIFORNIA STATE DENTAL ASSOCIATION. San Francisco. July 8th to 13th.

INTERSTATE DENTAL ASSOCIATION. (Col'd.) Buckroe Beach, Va. July 10th to 12th.

NEW JERSEY STATE DENTAL SOCIETY. Atlantic City. July 17th to 19th.

Examiners' Meetings.

INDIANA BOARD OF EXAMINERS. Indianapolis. June 17th to 22d.

MISSISSIPPI BOARD OF EXAMINERS. Jackson. June 19th.

NEW JERSEY BOARD OF REGISTRATION. Trenton. June 24th to 28th.

SOUTH CAROLINA BOARD OF EXAMINERS. Columbia. June 24th.

Dental Library Association.

BELIEVING that one of the most important functions of a dental library is the interchange and exchange of dental books and journals, it has been thought advisable by a great many dental librarians to form a Dental Library Association, similar to the Medical Library Association.

Object: The fostering of dental libraries and the maintenance of a system for exchange of dental literature and duplicates; securing and distributing the Transactions of dental societies.

Eligible for membership: Any dental society, association, university, college, or library having a fixed home and a dental library; any individual interested in dental literature or libraries.

Benefits: The banding together of a united body, with a common cause; the betterment of conditions in dental libraries; a clearing-house through which books, journals, reprints, or lists of these, may be sent from one library to another.

We desire to know what libraries now exist, and how many would be interested in the formation of such a society.

The undersigned may be addressed as Librarian First District Dental Society, at N. Y. Academy of Medicine, or as below.

DR. B. W. WEINBERGER,
40 E. 41st st., New York City.

Vermont State Dental Society.

THE forty-second annual meeting of the Vermont State Dental Society will be held at the New Sherwood Hotel, Burlington, Vt., on March 20, 21, and 22, 1918.

PHILIP E. MELLEN, *Sec'y*,
Middlebury, Vt.

Kansas State Dental Association.

THE annual meeting of the Kansas State Dental Association will be at Topeka, Kans., on April 15, 16, and 17, 1918.

C. K. WEAVER, *Sec'y*,
Clay Center, Kans.

Missouri State Dental Association.

THE fifty-third annual meeting of the Missouri State Dental Association will be held at Columbia, Mo., April 1, 2, and 3, 1918. A splendid program is in preparation, and great things may be expected.

J. F. WALLACE, *Sec'y*,
Canton, Mo.

Texas State Dental Society.

THE thirty-eighth annual convention of the Texas State Dental Society will be held at San Antonio, Texas, the famous City of the Alamo, April 10, 11, and 12, 1918. Members of other state societies are cordially invited to attend.

J. G. FIFE, *Sec'y*,
736 Wilson Bldg., Dallas, Texas.

Michigan State Dental Society.

THE sixty-second annual meeting of the Michigan State Dental Society will be held at the Hotel Statler, Detroit, Mich., the week of April 8 to 13, 1918. The regular meeting will be held on April 8th and 9th, with a splendid program. The remainder of the week will be a postgraduate meeting, in charge of the Detroit Club Clinic, at which every important branch of dentistry will be covered.

C. G. BATES, *Sec'y*,
Durand, Mich.

Odontological Society of Western Pennsylvania.

THE thirty-seventh annual meeting of the Odontological Society of Western Pennsylvania will be held in the Hotel Chatham, Penn ave. and Fourth st., Pittsburgh, Pa., Tuesday and Wednesday, April 9 and 10, 1918.

The Program Committee promises one of the best dental meetings ever held. Men of note will read papers of interest to the twentieth-century dentist.

The clinics will be given by the study clubs of Western Pennsylvania, and will be of interest to one and all.

Exhibitors will be amply accommodated with space by addressing Dr. Leslie Waddill, Jenkins Arcade Bldg., Pittsburgh, Pa.

KING S. PERRY, *Sec'y*,
719 Jenkins Bldg., Pittsburgh, Pa.

Ontario Dental Society.

THE fifty-first annual meeting of the Ontario Dental Society will be held in Toronto, Canada, April 29th to May 2d.

J. P. MACLACHLAN, *Sec'y*,
26 College st., Toronto, Can.

Connecticut State Dental Association.

THE fifty-fourth annual meeting of the Connecticut State Dental Association will be held at the Hotel Taft, New Haven, Conn., April 18, 19, and 20, 1918.

GEO. S. B. LEONARD, *Sec'y*.

Virginia State Dental Association.

CHANGE OF DATE OF MEETING.

THE Virginia State Dental Association will meet in Roanoke, Va., April 29 and 30, and May 1, 1918.

F. R. TALLEY, *Corr. Sec'y*,
Petersburg, Va.

Illinois State Dental Society.

THE fifty-fourth annual meeting of the Illinois State Dental Society will be held at Bloomington, Ill., May 14, 15, 16, and 17, 1918.

J. E. HINKINS, *President*,
Chicago, Ill.
J. P. LUTHRINGER, *Sec'y*,
Peoria, Ill.

Iowa State Dental Society.

THE fifty-sixth annual meeting of the Iowa State Dental Society will be held in Des Moines, Iowa, May 7, 8, and 9, 1918. An excellent program has been prepared, including seminars, papers, and clinics. A cordial invitation is extended ethical members of the profession from out of the state to attend any or all of these sessions.

E. R. SWANK, *Sec'y*,
Panora, Iowa.

Kentucky State Dental Association.

THE next annual meeting of the Kentucky State Dental Association will be held at Lexington, Ky., June 13, 14, and 15, 1918. An "amalgam program" of special interest.

Address all correspondence to

W. M. RANDALL, *Sec'y*,
1035 Second st., Louisville, Ky.

Pennsylvania State Dental Society.

THE golden anniversary meeting of the Pennsylvania State Dental Society will be held in Wilkes-Barre, April 23, 24, 25, and 26, 1918. Excellent talent has been secured for the occasion and the program extended to a four days' session. To judge by preliminary reports of committees, this event promises to be the greatest meeting in the history of this organization. All ethical practitioners are cordially invited to attend.

J. F. BIDDLE, *Sec'y*,
517 Arch st., Pittsburgh, Pa.

South Carolina State Dental Association.

THE annual meeting of the South Carolina State Dental Association will be held at the Jefferson Hotel, Columbia, S. C., June 27, 28, and 29, 1918.

W. BUSEY SIMMONS, *President*.
ERNEST C. DYE, *Sec'y*.

Dental Society of the State of New York.

THE fiftieth anniversary of the Dental Society of the State of New York will be held at Saratoga Springs, N. Y., June 13, 14, and 15, 1918. The society will endeavor to present a literary, clinic, and social program for the benefit of the profession, in keeping with its golden anniversary. A cordial invitation is extended to all members of the National Dental Association. For further information write

A. P. BURKHART, *Sec'y*,
52 Genesee st., Auburn, N. Y.

Northwestern University Dental School.

ALUMNI ASSOCIATION CLINIC.

THE Northwestern University Dental School Alumni Association will hold the Annual Home-coming Clinic, 31 W. Lake st., Chicago, Ill., on June 10 and 11, 1918. Special features have been provided which will insure a successful and interesting meeting. Make your arrangements now to be in attendance. For information address

M. M. PRINTZ, *Sec'y*,
4235 Lake Park ave., Chicago.

North Carolina Dental Society.

THE North Carolina Dental Society will meet on June 19 to 21, 1918. Headquarters, Oceanic Hotel, Wilmington, N. C.

W. T. MARTIN, *Sec'y.*

California State Dental Association.

THE California State Dental Association will hold its regular annual session for the year 1918 in San Francisco, July 8 to 13, 1918.

We will conduct our meeting this year on the Oklahoma plan, and feel that we can assure all who attend a pleasant as well as a profitable meeting. Further information may be obtained by addressing

JOHN E. GURLEY, *Sec'y,*
350 Post st., San Francisco.

New Jersey State Dental Society.

THE forty-eighth annual convention of the New Jersey State Dental Society will be held on July 17, 18, and 19, 1918, on Young's Million Dollar Pier, Atlantic City, N. J.

The entire convention will be held on the pier. Machinery Hall will be used for the exhibits. Those who attended last year will remember the magnificent display of dental goods, and Dr. S. I. Callahan of Woodstown, N. J., chairman of the Exhibit Committee, with 25,000 square feet of space available, has promised an exhibit greater than that of 1917.

Machinery Hall extension, with 10,000 square feet of space, will give ample room for clinics. Dr. Edward Stillwell of Glen Ridge, N. J., is chairman of the Clinic Committee, and has already arranged for a number of new and interesting clinics. This section will be of special interest.

The Essay Committee, under the direction of Dr. C. M. F. Egel of Westfield, will present two or three essayists of prominence whose names and subjects will be announced later.

All meetings for the presentation of papers as well as the business meetings will be held in the Greek Temple. This is a delightfully cool spot half-way out on the pier.

The headquarters of the society will be at the pier entrance. Mail may be directed to exhibitors, clinicians, or members in care of the secretary, New Jersey State Dental Society, Young's Million Dollar Pier, Atlantic City, N. J.

A list of hotels where special rates may be secured will be published in the *New Jersey Dental Journal* prior to the convention, or may be secured by addressing the secretary.

A cordial invitation is extended to ethical practitioners.

JOHN C. FORSYTH, *Sec'y,*
430 E. State st., Trenton, N. J.

Western Fairfield County (Conn.) Dental Society.

UNDER the above name the dentists of Stamford, Norwalk, Greenwich, New Canaan, and Darien have organized a new dental society.

The officers are as follows—J. D. Hertz, Stamford, president; Wm. L. Weed, Norwalk, vice-president; O. T. Rule, Stamford, secretary; R. G. Collins, Greenwich, treasurer.

O. T. RULE, *Sec'y,*
Stamford, Conn.

Forsyth Training School for Dental Hygienists.

ALUMNÆ ASSOCIATION.

THE Alumnæ Association of the Forsyth Training School for Dental Hygienists, Boston, Mass., held its first meeting at the Forsyth Dental Infirmary for Children on January 15, 1918. Dr. E. C. Briggs was the speaker of the evening. His interesting speech was greatly enjoyed by all present. Dr. Harold DeW. Cross, director of the Forsyth Dental Infirmary for Children, also addressed the alumnæ, and made some helpful suggestions.

MISS KEENAN, *Sec'y,*
Foxboro, Mass.

New Jersey Board of Registration.

THE State Board of Registration and Examination in Dentistry of New Jersey will hold their annual meeting and examination in the Assembly chamber, at the State-house, Trenton, N. J., on June 24, 25, 26, 27, and 28, 1918. License fee $25, re-examination fee $10.

Attention is directed to the following quotation from the dental law of New Jersey: "Applicant shall present to said board a

certificate from the commissioner of education of this state, showing that before entering a dental college he or she had obtained an academic education consisting of a four-year course of study in an approved public or private high school, or the equivalent thereof." In accordance with this law the secretary will issue application blanks only upon presentation of the required certificate from the commissioner of education. State-house, Trenton, N. J.

Applications must be filed complete ten days before the date of the examinations. Address all communications for further particulars to

JOHN C. FORSYTH, *Sec'y*,
430 E. State st., Trenton N. J.

Indiana Board of Examiners.

THE next meeting of the Indiana State Board of Dental Examiners will be held at the State-house, Indianapolis, June 17 to 22 inclusive. Applications and other information may be obtained by addressing

H. C. MCKITTRICK, *Sec'y*.
Indianapolis, Ind.

South Carolina Board of Examiners.

THE annual meeting of the South Carolina Board of Dental Examiners will be held at The Jefferson, Columbia, S. C., beginning promptly at 9 o'clock, Monday morning, June 24, 1918.

All applications must be in the hands of the secretary by June 14th. Application blanks and full information may be obtained by addressing

R. L. SPENCER, *Sec'y*,
Bennettsville, S. C.

Mississippi Board of Examiners.

THE Mississippi Board of Dental Examiners will hold its next annual meeting at the State Capitol building in Jackson, on the third Tuesday in June 1918, at 8 A.M. Fee for examination $10. Practical and written examinations. Diploma from recognized school and certificate of moral character required. No reciprocity or interchange. For further information, address

B. J. MARSHALL, *Sec'y*,
Marks, Miss.

UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING JANUARY 1918.

January 1.

No. 1,251,912, to NILS W. NORDSTROM. Removable denture.

No. 1,252,038, to H. K. SANDELL. Dental alloy.

No. 1,252,179, to SHERIDAN RISLEY. Dental tool.

No. 1,252,291, to NILS W. NORDSTROM. Artificial denture.

January 15.

No. 1,253,555, to MELANIE WOLF. Surgical basin.

No. 1,253,585, to ELIAS T. GOLDBERG. Artificial tooth.

No. 1,253,654, to GEORGE S. WHITAKER. Dental retainer and process of making same.

No. 1,253,946, to JOSÉ ANTONIO DE CARVALHO, JR. Dental blowpipe burner.

No. 1,253,967, to FRED E. HART. Porcelain tooth crown and backing adjustment.

January 22.

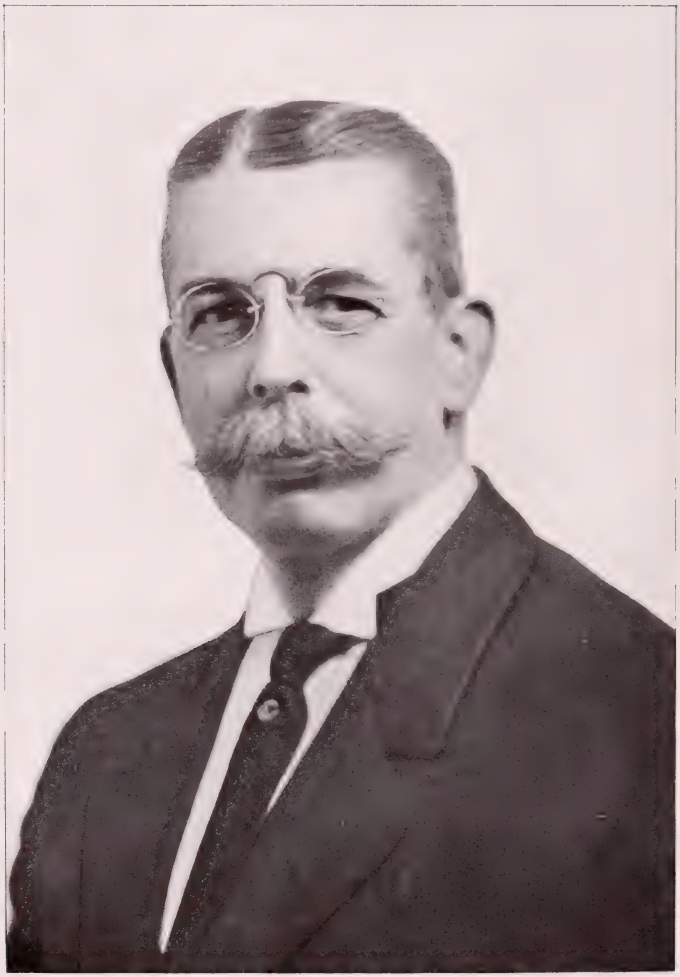
No. 1,254,532, to FREDERICK N. PAUL. Toothbrush.

January 29.

No. 1,254,670, to LUTHER W. FROMM. Manufacture of artificial teeth.

No. 1,255,027, to JOHN LEHNER. Suction mechanism for dental plates.

No. 1,255,109, to WILLIAM W. RUSS. Matrix band for dental purposes.



DR. JOHN R. CALLAHAN.

THE

DENTAL COSMOS

VOL. LX. APRIL 1918. No. 4

ORIGINAL COMMUNICATIONS

The Relationship of Oral Secretions to Dental Caries:

III. Ferments of Human Saliva Other Than Amylase.

By HERMANN PRINZ, D.D.S., M.D., Philadelphia, Pa.

From the Laboratory of Pharmacology, Evans Institute, Univ. Pennsylvania.

(Continued from page 203.)

FOR some time past it has been known that human saliva is endowed with biochemical properties other than the mere saccharification of cooked starch into maltose by its amylase content, and that these facts strongly point to the possible presence of other ferments. An analysis of the salivary glands of the ox by Rosell revealed the presence of five intracellular ferments, *i.e.* amylase, aldehydase, indo-phenol oxydase, catalase, and trypsin. The writer has made numerous attempts to isolate and if possible disclose the dynamics of the various ferments present in human saliva, and he succeeded in definitely verifying the existence of amylase, maltase, catalase, and oxydase. To detect trypsin, which is claimed by some investigators to be present in human saliva, the very sensitive casein-acetic acid reaction of Michaelis was applied, but not even the minutest trace of this ferment could be revealed.

Ferments, according to Abderhalden, may, in general, be divided into two main groups, viz, the hydrolytic and the oxidizing ferments. The former may be further subdivided according to the material to be attacked, into (*a*) ferments which effect the decomposition of the carbohydrates, *i.e.* carbohydrases, (*b*) the proteolytic ferments which act upon the proteins, *i.e.* proteases, and (*c*) the fat-splitting ferments, *i.e.* lipases.

According to the above grouping, the ferments of human saliva are represented by the carbohydrase group of the hydrolytic enzymes and by oxidizing ferments. Proteolytic and fat-splitting ferments so far have not been observed in the normal secretions of the oral cavity. Amylase, and to a much less extent maltase, are the principal carbohydrases, while oxy-

TABLE.—RELATIVE QUANTITIES OF AMYLASE, CATALASE, AND OXYDASE IN HUMAN SALIVA.

Case No.	Sex.	Color.	Age.	No. of cavities in teeth.	No. of fillings in teeth.	No. of missing teeth.	No. of artificial teeth.	Care of teeth.	General health.	Hours after latest meal (breakfast or lunch).	Amylase.	Catalase.	Oxydase.
1	m	w	50	0	3	1	0	Good	Good	2 (hr.)	240	97.3	55
2	f	"	50	0	0	32	28	"	"	2 "	80	12	20
3	m	"	32	10	10	3	0	"	"	2½ "	160	65	35
4	m	"	50	0	3	1	0	"	"	1 "	160	57	60
5	f	"	29	10	9	3	2	"	"	2 "	80	15	25
6	f	"	35	6	6	2	0	"	"	3 "	160	62	30
7	m	"	20	0	8	9	2	Fair	"	2 "	120	35	25
8	m	"	34	7	5	3	0	Poor	Poor	2 (1.)	120	30	35
9	m	"	24	19	13	6	0	Good	Fair	1½ "	200	60	45
10	m	c	54	4	0	25	14	Poor	Good	3 (hr.)	180	55	40

dase and catalase typify the oxidizing ferments of human saliva. The representatives of this latter group are accredited with being the oxygen-carriers of the living tissue cell, that is, are catalytic agents which by their mere presence, even in the very minute quantities and without losing their identity, cause an indefinite amount of oxidation. These ferments are known as oxydases. The resultant peroxids of the oxydase activities are, in turn, acted upon by an additional group of ferments which by their catalytic properties reduce these peroxids with the evolution of oxygen. They are known as catalases.

The properties and dynamics of amylase have been discussed in previous papers (see DENTAL COSMOS issues for February and March). Maltase, sometimes referred to as glucodase, is a ferment which is widely distributed in the animal and vegetable kingdoms. From animal tissues it has been isolated from the salivary glands, the liver, the pancreas, etc., while in the vegetable kingdom malt and yeast are extremely rich in this enzyme. The principal function of maltase consists in splitting one molecule of maltose into two molecules of glucose.

In human saliva, very small quantities of maltase usually accompany the amylase, as was first pointed out by Von Mering. Neilson and Sheele contend that the rise and fall of the amylase index is proportionally shared by that of the maltase index. There seems to exist a close interdependence between the quantities of the various ferments, which as we have observed is apparently participated in by all the salivary ferments.

As we have mentioned above, the process of oxidation and reduction as occurring in the living cells depends upon the presence of substances which combine loosely the free oxygen at a comparatively low temperature, and which are capable of giving off their oxygen to dioxidizable substances, such as our foodstuffs. These agents are ferments, and as they are capable of changing their function repeatedly, they are referred to as reversible enzymes. As a matter of

fact, all enzyme action is reversible. But not merely the metabolic changes as occurring in the living cell depend upon this reversible enzyme action, but, as a sequence, the action of drugs. Pharmacologic action can only be explained upon the basis of a chemic interchange between the drug and the living protoplasm by means of these substances. These agents which carry on the never-ceasing process of oxidation and reduction are known as oxydases and catalases, and they are so closely allied in regard to their action that, as Kastle has pointed out, it may be, after all, that when examined more closely the catalases will show peroxydase reaction. As it is, the two sets of substances, if they are really distinct, are certainly found in the closest and most intimate association in both the plant and animal tissues. According to Chodat, oxydases are ferments which influence the process of oxidation in the living cell either positively or negatively; in harmony with their specific function they are divided into oxygenases, *i.e.* bodies which take up molecular oxygen to build up peroxydases, and peroxydase which materially increase the stagnant peroxids present in dilute solutions.

Catalases may be looked upon, according to Herlitzka, as agents possessing the faculty of reducing peroxids and thereby acting as protectors of the living organism. Through the decomposition of hydrogen dioxid as resultant from the peroxydase action, into water and molecular (inactive) oxygen, the living cell is protected against the injurious effects of super-oxidation. Recent experiments carried out in the physiological laboratory of the University of Illinois which point to the fact that an increase or decrease in the amount of work, and hence in oxidation, in a muscle, is accompanied by a corresponding increase and decrease in the amount of catalase, would seem to suggest that catalase may play a rôle in the oxidative processes of the body.

In his doctorate thesis, Slowtzow of Petrograd, in 1899, discusses the nature and function of oxydase occurring in saliva, and Smith and MacDonald of Boston, in 1911, again refer to it in response to an inquiry by Dr. H. C. Ferris regarding the presence of a germicidal agent in saliva. As we intend to consider the biological significance of human saliva relative to its general ferment content in regard to dental caries in a later communication, we wish to reserve the discussion of this phase of the subject until then.

The various tests for maltase, catalase, and oxydase as employed for the purpose under consideration are discussed in the subsequent pages. As regards maltase, the various tests employed have been, in general, unsatisfactory owing to the very small amount of this ferment present in saliva. For the catalase test we have selected the permanganate method as giving most excellent results. It is based upon the equation:

$$2KMnO_4 + 5H_2O_2 + 4H_2SO_4 : 2KHSO_4 + 2MnSO_4 + 8H_2O + 5O_2.$$

From the various tests which have been recommended for oxydase, we can vouch for good results obtained with the indophenol reaction (Röhmann-Spitzer). Smith and MacDonald claim that the color obtained with a freshly prepared 1 per cent. solution of pyrocatechin is a sufficient test for this enzyme in saliva.

TESTS FOR MALTASE.

Numerous tests for maltase are recommended in the various text-books. The minute quantities in which this ferment is present in saliva, and its frequent absence, eliminate certain tests completely, while others are applied only with difficulty. As maltase cannot be readily separated from amylase, the writer admits that in general the various tests for maltase in saliva have not been very satisfactory in his hands. The often-recommended reduction test with Barfoed's reagent for the above purposes has always failed. Polarization may be successfully employed, but rather copious quantities of the digested substratum are required,

and consequently large quantities of individual saliva. The degree of rotation of maltose hovers about (α) D, = 138°, while that of glucose equals about (α) D, = 53°. As a test for the qualitative estimation of maltase the phenyl-hydrazin test can be recommended. This test is based upon the property possessed by certain sugars to form osazones, *i.e.* definite crystalline bodies which are typical for each sugar. Maltose-azone and glucose-azone may be obtained from saliva in the following manner: A test tube containing a mixture of 10 cc. of a 1 per cent. soluble starch solution and 1 cc. of saliva is placed in a water-bath of 38° for fifteen minutes. In the bottom of a small test tube, enough to fill its rounded portion only, an intimate dry mixture of two parts of phenyl-hydrazin hydrochlorid and three parts of sodium acetate by weight is placed, to which is added 5 cc. of the digested starch solution. The mixture is thoroughly shaken and heated in the boiling water-bath for at least 1½ hours. The viscid sediment which is frequently formed at the beginning of the test should be filtered off at once. The tube is allowed to cool slowly in the water-bath, and the resultant crystals are examined microscopically. Typical crystals of maltose-azone are readily observed and occasionally crystals of glucose-azone may be seen; the latter indicate the presence of maltase.

TEST FOR CATALASE.

Required solutions:

(1) Saliva.
(2) 1 per cent. solution of hydrogen dioxid.*
(3) N/10 solution of potassium permanganate.†
(4) 2½ per cent. solution of sulfuric acid.

One cc. of freshly secreted saliva is mixed with 5 cc. of 1 per cent. solution of hydrogen dioxid in an Erlenmeyer flask of about 50 cc. capacity, covered with a watch crystal and allowed to stand at room temperature, with frequent shaking, for two hours. Ten cc. of 2½ per cent. sulfuric acid is now added, and the agitated mixture is at once carefully titrated with N/10 solution of potassium permanganate. At the appearance of the pink tint, which must remain unaltered for fifteen seconds, the titration is completed and the number of cc. used, read in one-tenth fractions, is noted. The control test, started simultaneously with the main test, consists of the same mixture, except that distilled water is substituted for the saliva. From 6 to 7 cc. of the permanganate solution is usually necessary to decompose the control test, H_2O_2 solution. By comparing the number of cc. of the permanganate solution required in the titration of the two tests a quotient is obtained which indicates the numerical power of the catalase present.

The problem involved in the catalase test may be stated as follows: How many cc. of N/10 $KMnO_4$ are required to decompose a mixture of a given quantity of a ferment *plus* hydrogen dioxid solution exposed within a given time to room temperature, as compared to the same quantity of hydrogen dioxid *without* the ferment employed as the standard test? The number of cc. of N/10 $KMnO_4$ required for the catalase test may be represented as CT, and that of the standard test as ST, while the assumed quantity of catalase which completely decomposes 100 cc. of 1 per cent. H_2O_2 may be arbitrarily represented by 100, or as $C(100 - x)$. Consequently the formula for the catalase index reads:

$$\frac{CT}{ST} = C(100 - x)$$

Ex. If 38 cc. of N/10 $KMnO_4$ be required to decompose 100 cc. of 1 per cent. H_2O_2 + ferment solution, and 138 cc. for the same quantity of the standard test solution, its quotient reads:

$$138 \div 38 = 27.5,$$

* Fifty grams of solution of hydrogen dioxid U. S. P. is diluted with 100 cc. of distilled water.

† N/10 solution of potassium permanganate for this purpose is prepared by dissolving 15.8 grams of potassium permanganate, c. p., in 1 liter of distilled water. After standing for 48 hours the solution is filtered.

which when subtracted from the catalase standard, *i.e.*

$$100 - 27.5 = 72.5;$$

the latter represents the quantity per cent. of the catalase present.

The above procedure furnishes excellent comparative results. If one is interested in the exact amount of hydrogen dioxid decomposed, a freshly standardized solution of potassium permanganate, containing 0.316 per cent. of the salt, should be employed; 1 cc. of this solution corresponds to 0.002 of hydrogen dioxid.

TEST FOR OXYDASE.

Required solutions:

(1) Saliva.
(2) 1 per cent. alpha-naphthol solution.*
(3) 0.75 per cent. aqueous para-phenylene-diamin solution.
(4) 1.7 per cent. sodium carbonate solution.

One-half of one cc. of freshly secreted saliva is placed in a Petri dish 8.8 cm. in diameter, having a polished bottom. One cc. each of solutions 2, 3, and 4 are mixed in a graduated cylinder and diluted to 10 cc. with distilled water. Of this solution 5 cc. is added to the saliva, carefully mixed, covered, and allowed to stand at room temperature for one hour; then 5 cc. of 95 per cent. alcohol is added, thoroughly mixed, and allowed to stand for one-half hour. The alcohol will dissolve the freshly formed indophenol. The mixture is filtered and compared colorimetrically with a standard color solution.

The standard test color solution is prepared by mixing 3 cc. of the undiluted alkaline alpha-naphthol para-phenylene-diamin solution with 50 cc. of diluted alcohol, *i.e* equal parts of 95 per cent. alcohol and distilled water, and allowing it to rest for about three to four days, or until the maximal color of indophenol has developed. As this solution fades readily, it must be renewed as soon as a change in the intensity of color is noted, viz, in about two weeks. The color of indophenol is of a deep violet-blue. A more lasting test color solution which closely matches the indophenol solution may be made by adding diluted ferric chlorid solution to an aqueous solution of salicylic acid, or by using a very diluted solution of methyl-violet-B. In the absence of an expensive colorimeter a useful home-made apparatus for this purpose may be readily constructed according to the following directions: Ten small test tubes of the same diameter and size are placed in a test-tube rack and serially numbered. Tube 1 is filled with 10 cc. of the indophenol standard solution; tube 2 receives 9 cc. of the standard test color solution and 1 cc. diluted alcohol, and the remainder of the tubes are charged in the same manner with the geometrically diluted indophenol solution. By comparing the saliva-indophenol solution, placed in a test tube of the same size as that of the test solution, with the standard color solutions, against a sheet of white paper in a good light as a background, fairly reliable comparative results are obtained.

* 1 gram of alpha-naphthol is dissolved in 100 cc. of a mixture of equal parts of alcohol and water.

THE SUPPOSED SUGAR CONTENT OF HUMAN SALIVA.

Blood, lymph, muscle, and other tissues of the human organism contain variable quantities of sugar. Normal human blood contains an average of from 0.06 to 0.11 per cent. of sugar. The quantity varies within limits depending primarily upon ingested foodstuffs. Under certain pathologic conditions, as in glycosuria, diabetes, uremic nephritis, etc., the quantity of sugar in the blood may be materially increased; as much as 1.11 per cent. has been recorded. The presence of sugar in the urine, especially under pathologic conditions, is so well known that it does not need to be especially emphasized. Basing our conception hypothetically upon these facts, it is, *a priori,* very alluring indeed to assume that sugar might be present in normal or in pathologic saliva, and that as a consequence this supposed sugar content may have

some possible bearing on the etiology of dental caries. Indeed, this conception is by no means new; numerous investigators, among whom especially Michaels and Kirk should be mentioned, have discussed this very problem. In a paper by Kirk, "A Reconsideration of the Etiology of Dental Caries, and a New Theory of Caries Susceptibility," published in the DENTAL COSMOS for January 1914, the following statement will be found:

> In several communications, notably those already referred to as having been read before the Ohio State Dental Society in 1902 and before the Michigan State Society in 1913, I called attention to the probable existence of a fermentable carbohydrate substance in the saliva, the result of carbohydrate metabolism derived from the blood through the medium of the salivary glands. My attention was first directed to this matter in some studies of the saliva that I made in the laboratory with Joseph Porter Michaels in Paris in 1901. One of the routine tests made by Michaels in the examination of all specimens of saliva submitted to him was what he called the glycogen test, and I find in my notes made at the time that glycogen, according to Michaels, had been detected in the saliva by Salomon, and that other carbohydrate substances—for example, glucose—had been detected by Lecorché, Pavy, Lehmann, Jordeo, Nasse, Koch, and Gorup-Besanez, and that Arthus had determined the presence in the saliva of erythrodextrin, achroödextrin, and of maltose; and Michaels says: "I have myself determined the presence of sugar in the saliva of diabetics. Glucose takes a red coloration with Nessler's reagent, which passes into a grayish blue."

He says, further:

> The difference of opinion relative to the passage of sugar into the saliva and the perspiration is explainable as follows: Sugar passes with difficulty into the saliva, and it is not apparent in appreciable quantities except in pronounced diabetics. The saliva contains large quantities of bacteria, and unless certain precautions are taken the contained sugar disappears by fermentation. The albuminous substances may interfere with the fermentation. According to Claude Bernard, cane sugar injected into the blood does not pass into the pathological saliva.

J. P. Michaels in his interesting brochure, "Sialo-semeiology," states that "There is a great divergence of opinion between authors in regard to the elimination of sugar through the sweat and saliva of diabetic patients," and enumerates these opinions as quoted by Kirk. In discussing the metabolism of diabetes mellitus, Von Noorden makes this statement:

> Most researches upon the presence of sugar in the saliva have proved negative. Külz, however, quotes several observers who found it; and Fleckseder has recently reported two cases with a positive sugar reaction. F. Kraus, Jr., working in my laboratory, and using the most sensitive tests, including that of phenyl-hydrazin in each case, could find no trace of sugar in the saliva of ten severe cases who were excreting sugar in large quantities. Theoretically, one would think sugar ought to appear in the saliva sometimes, seeing that a dog's salivary glands let sugar through when 0.8 per cent. is present in the blood. Sugar values as high as this were obtained by transfusion with dextrose solution; they scarcely ever occur spontaneously in diabetes, but one would think patients would be found now and then whose salivary glands were abnormally permeable to sugar. In all researches upon the subject it is necessary to analyze the saliva fresh and pure, since reducing bodies may be derived from the decomposition of mucin. The sweet taste in the mouth that diabetic patients often complain of is probably not due to the presence of sugar, but to that of acetone.

To satisfy himself relative to the sugar content of saliva, the writer has utilized two very sensitive tests for this purpose, *i.e.* the micro-method of Ivar Bang, which allows a fair estimation of 0.02 mgm. in 100 cc. menstruum, and the micro-analysis of Bertrand as modified by Michaelis and Rona. The latter method, while somewhat complicated, is especially to be recommended for the above purpose, as it allows an accurate determination of even the minutest quantities (less than 0.02 mgm.) of glucose. In no case, even in a saliva from a diabetic patient with a known sugar content of 7 per cent. in the urine, could the faintest trace be obtained. Basing his conception on experimental data, the writer must deny the presence of sugar in human normal or pathologic saliva.

(To be continued.)

40TH AND SPRUCE STS.

Effects of Decayed Teeth upon a Child's Progress in School.

By EARLE E. JOHNSON, D.D.S., Burlington, Vt.,
DIRECTOR OF VERMONT RURAL DENTAL CLINICS.

(Read before the Bennington County Teachers' Association, Bennington, Vt., February 7, 1918.)

IT is my purpose today to present for your consideration some thoughts upon the condition of the children's teeth, and to give you an idea of the work that has been undertaken in this state by the "rural dental clinics" for the care of the children's teeth.

Vermont has the honor of establishing the first system of rural dental clinics in the country, and she may well feel proud of this fact, as it is recognized by the dental profession as the ideal method of procedure in the rural districts. The funds for the carrying out of this work were obtained through the generosity of Miss Emily Proctor and Hon. Redfield Proctor, who, realizing that the health of the child depends in a great measure upon the condition of the teeth, and appreciating the practical impossibility of the majority of the rural school children receiving dental treatment, established a fund for this purpose.

You are all more or less familiar with the plans for carrying out the work. In brief, it is to reach the rural districts that do not have access to a dentist, and to treat all of the children in these districts between the ages of six and twelve years who are in need of treatment, which will be practically *all*. This age limitation is made necessary on account of the large territory to be covered, and in view of the fact that the greatest amount of good can be accomplished between these ages.

EQUIPMENT FOR THE RURAL CLINIC.

A complete equipment consists of a car and a portable army dental unit, which is capable of being set up in a short time and occupies a minimum amount of space. This unit can all be packed into a specially constructed box on the car, weighs about 500 pounds, and can be moved from one place to another with very little inconvenience.

This work will be done in the schoolhouses where possible, and will be consistent with the most advanced ideas of clinical dental pediatrics. The territory should be covered every six months, and *will be* after we have a sufficient number of men to make this possible.

While the operative procedures are very essential, the educational value of illustrated lectures, toothbrush drills, etc., is of prime importance. During these years a child's mind is very receptive and is capable of being molded and receiving impressions that would be lost upon the custom-hardened intellect of their elders. Therefore any correct hygienic principle instilled into their minds at this time will follow them through life, and will save them much suffering and disfigurement.

The physical examination of school children shows that from 95 to 99 per cent. are in need of immediate dental treatment, and the most conspicuous defect of the children is their unsanitary mouths. The children that have come under our observation average from eight to ten cavities each, usually accompanied by two or three broken-down, abscessed teeth which are continually pouring pus into the system and undermining the health of the child. Just consider for a moment what this condition means—eight or ten cavities ranging in size

from a pinhead to a total destruction of the crown of the tooth; eight or ten holes filled with rotten, decaying food, sometimes weeks old, with additional fragments lodged between many of the other teeth, constituting almost a teaspoonful of fetid matter, and they are actually mixing this decomposing mass with all the food and drink that they take.

Dr. Kirk says that this constant drain of poison into the intestinal tract in child life causes an intestinal indigestion in which bacterial products are absorbed into the system, and produce fevers, headaches, eye-strain, anemia, malaise, and constipation. Nature finally takes away the child's appetite and forces it to bed until a good house-cleaning can be accomplished. The poisons from the mouth are insidious and slow in action; many can and do withstand them for years, but as the constant dropping of water will wear away the stone, so will the products of decomposing food in the mouth soon destroy a good digestion and undermine the system.

IMPORTANCE OF CARING FOR THE TEETH OF SCHOOL CHILDREN.

It is unfortunate that the teeth of children, just at the age when thorough mastication is of greatest importance, are allowed to decay to such an extent that it becomes a painful operation for the child to masticate food at all. It is during this age that the greatest development should take place, but most of the children are dental cripples by this time. A child cannot be expected to develop into a healthy adult with a strong mind if it is deprived of efficient means of chewing its food properly, or if the food must pass through an infected and uncared-for mouth that is more like a cesspool than a receptacle for the transmission of food to the human body, every ounce of which must pass through this disease-breeding area, and naturally becomes burdened with numerous colonies of bacteria. No wonder such children are sickly and lacking in strength to resist disease, or that they are not considered bright and intelligent, figuring many times as members of our mentally deficient class in school work. No child can grow in grace, mentality, or stature with a body that is not properly nourished, with organs seeking to grow and develop but with nothing to grow or develop on, and these are the exact conditions present in many cases.

Diseased teeth are usually aching teeth, and a child with toothache is not able to meet the requirements of our modern educational system. Eating is a process to be avoided, and it is practically impossible for the child to sleep. Weakened by the loss of sleep and the lack of nourishment, he becomes discouraged in everything that he undertakes, is lacking in ambition, and is pessimistic. His standard of self-respect and respect for his teachers and classmates is lowered, his judgment is clouded, and his ability to discriminate between right and wrong is greatly handicapped. His associates are in keeping with his lowered ideals, and we are permitting a child to start on the downward path through no fault of his own.

UNCLEAN MOUTHS A MENACE TO PUBLIC HEALTH.

Forgetting for a moment the effect that an unclean mouth has upon an individual, let us turn our attention to the result it has upon the public. Today everybody feels that the condition of their children's mouths is their own private affair. We must get away from this selfish, erroneous, and dangerous attitude, for with every breath from an unclean mouth millions of pathogenic bacteria, easily capable of inoculating another person with a virulent organism, are expelled from one to ten feet, and a filthy mouth becomes as much a public menace as the unswatted fly, filthy streets or garbage cans.

Miller claimed to have isolated about sixty kinds of bacteria from the juices and deposits in the mouth, a great many of which were disease-producing.

The mouth is an ideal incubator, for here we find all of the essentials for

the propagation and development of these organisms—the right temperature, sufficient moisture, darkness, and a menu to choose from that would tempt any member of this large family.

An unclean mouth means an increased number of bacteria, and with increased numbers come increased dangers from infection. The bacteria which cause tuberculosis, pneumonia, measles, scarlet fever, diphtheria, erysipelas, influenza, cerebro-spinal meningitis, and many other diseases, have the mouth as their happy hunting-ground, and are ready to set up their specific disease whenever the bodily resistance becomes lowered.

Children with defective teeth are more susceptible to all contagious diseases, and are apt to pass them on by means of borrowed pencils, rulers, and handkerchiefs, making the condition of their mouths one of concern to all parents.

During an epidemic of scarlet fever in Chicago those affected were of course sent away, quarantined, and the other usual precautions taken, and were not allowed to return to school until well. Their return was frequently followed by a fresh outbreak of the disease, the cause of which could not be determined for a long time. After the enforcement of a regulation requiring each child having the disease to have the mouth cleaned and every cavity in the teeth filled before returning to school, the epidemic was stopped. Similar results were also obtained at St. Vincent's Orphan Asylum in Boston. The average number of contagious diseases in that institution was about 100; this was reduced to two cases after the establishment of a dental infirmary. These illustrations show what can be accomplished by proper dental attention, and since it is the state that has to pay so dearly for these epidemics, the condition of the child's mouth should be one of interest to all.

ECONOMIC VALUE OF CLEAN MOUTHS TO THE COMMUNITY.

In Cleveland, Ohio, 97 per cent. of the school children had defective mouths. In the prosecution of the clinical work to improve the mouth conditions twenty-seven of the children selected as having the greatest amount of oral defects in a school of 846 pupils showed after proper dental attention an average increase in their efficiency in school work of 99.8 per cent. This was apparently due wholly to the correction of their oral conditions and teaching them the proper care and use of their mouths. The improvement in their physical and moral standards was quite as marked as that in their mental activity. These results are in keeping with other statistics in this field, and we could produce similar results in every community. Every school has a certain percentage of retarded pupils, pupils who have failed to pass to higher grades. The cost of having the child make up this work amounts to millions of dollars throughout the country, a large percentage of which could be saved by giving the children proper dental attention. Two or more decayed molars will keep a child back six months in school during the first eight grades, which means an extra cost of from $25 to $50. In New York City a few years ago 67,000 children failed to be promoted to higher grades because of absence, 80 per cent. of which was laid either directly or indirectly to defective teeth, costing the city of New York $1,037,696. It has been clearly demonstrated that the worse the condition of the teeth, the worse the school standing of the child.

You have seen scores of pupils absent from school on account of the toothache, and you realize that the anemic, ill-nourished, stupid, retarded child is almost always one with a foul, unclean mouth. "What is the use," says a noted educator, "of trying to teach arithmetic to a child whose capabilities are only half their maximum, due to a grossly neglected oral cavity."

When you see a child who is from one to three years behind his proper grade, is pale, listless, apathetic, gives a history of headaches, and is unable to cope with his studies, you can take it for granted that you will find upon examination actually repulsive conditions of the mouth.

These unfortunates are being deprived of this measure of education, besides endangering the health of other children by reason of their susceptibility to infectious disease, simply because the public does not realize that the condition of the child's mouth is a part of their business, and does not insist upon having this condition remedied.

DR. OSLER ON DEFECTIVE TEETH.

Dr. Osler, the noted physician, says, "If I were asked to say whether more physical deterioration was produced by alcohol or defective teeth, I should unhesitatingly say, Defective teeth," which is the light in which it is viewed by the medical profession at the present time.

Taking, then, this specific knowledge as to the deleterious effect of a diseased mouth upon the child, school, state, and nation, into consideration, it becomes a great economic and sociological problem that should appeal in the highest degree to all teachers who are interested in the welfare of the child.

Summing up, then, oral cleanliness means less disease. It means fewer physicians' and dentists' bills. It means more work and play and less discomfort and pain. It means more attractiveness and greater self-respect, more aggressiveness and greater initiative, more of the rose-tint of health and less of the wanness of disease. It means stronger bodies and brighter minds, greater vitality and less physical and moral insufficiency and renders the child better able to choose between right and wrong.

In conclusion, to say that most of the ills of the human family are due to the lack of proper care during the period of childhood is not saying more than is generally conceded by those who are most competent to judge; and statistics show that the teeth are directly or indirectly responsible for from 80 to 90 per cent. of all these ills.

Vincent's Angina from the Oral Surgical Standpoint.

By HARRY A. HAINES, D.D.S., Philadelphia, Pa.,
SENIOR RESIDENT DENTAL SURGEON, PHILADELPHIA GENERAL HOSPITAL.

VINCENT'S angina should be recognized by all dentists, from the fact that patients suffering from this disorder will visit the dentist first, believing that the trouble has its source in their teeth or gums, and usually around their third molars.

Definition. It is an acute infection of the mouth, the etiology of which is the action of Bac. fusiformis and a variety of spirillum (Spirochæta denticola).

SYMPTOMS.

The period of incubation is about six days; the onset is insidious. Although the throat may be little complained of, the granular enlargement will attract the attention of the dentist, as it can be seen upon observation of the region around and below the angle of the jaw. The patient complains of headache and malaise, and the tongue is coated. The patient's temperature never exceeds 101° F., and is sometimes normal throughout the course of the disease.

CLINICAL FEATURES.

Upon observation of the mouth, the gums around the upper and lower second and third molars may show ulceration. There also may be found spots of ulceration upon the bucco-mucosal reflection, which may extend posteriorly toward the tonsil region.

Ulceration may become thickened, and when detached around the edges new membrane forms. This ulcerative tissue is necrotic tissue. In color it may be of the soft gray, yellowish gray, or greenish variety. There is a distinct fetid odor to the breath which is different from that of any other form of stomatitis.

In differentiating this from syphilitic chancre the following features are useful: (1) Angina ulceration is more tender to touch, (2) more superficial, (3) with granular enlargement in the region of the angle of the jaw, and (4) examination of the microscopic smear will determine the diagnosis.

I have treated several cases received in the Philadelphia General Hospital (Oral Surgical Department) and obtained excellent results.

The following record of a case will serve as an illustration:

Patient, a colored girl of twenty-eight, admitted January 4, 1917. At the Philadelphia General Hospital oral surgical clinic held January 6, 1917, by Dr. Carlton N. Russell, the case was diagnosed as Vincent's angina.

Physical examination showed ulcerations about the regions of the second and third molar teeth, also upon the buccomucosal reflection and posteriorly toward the tonsil region.

Symptoms. The patient complained that the teeth were all sore to touch; she could not eat, suffered with headache and malaise, and had difficulty in swallowing. There were present enlarged glands and swelling about the region of the angle of the jaw.

Two smears on glass slides were sent to the laboratory and returned with a positive diagnosis of Vincent's angina. The patient's temperature ran normal.

Treatment. The patient was given a laxative, and ordered to use three times daily potassium permanganate (solution of 1:3000) with cotton upon applicators. Some of the ulcerative tissue was removed and the region swabbed with a 5 per cent. solution of hydrargyri nitras. The swollen region around the angle of the jaw was painted with 10 per cent. tincture of iodin. This treatment was continued, and the patient's condition cleared up in about eight days. This is only one of the many cases of Vincent's angina similarly treated with success.

Another antiseptic treatment used and from which I have obtained results is swabbing the parts with one of the following preparations: Copper sulfate 10 per cent., Lugol's iodin, phenol in glycerin 5 per cent., saturated solution of potassium permanganate.

In connection with the above I prescribe the use of a good germicidal mouthwash, such as potassium permanganate (solution 1:3000) or potassium chlorate.

Vincent's angina should be diagnosed and treated by all dentists, as it is a mouth condition which clearly falls within their scope of practice, especially as it is most likely to be presented first to the dental practitioner in its initial stages, when treatment should be promptly instituted to avert its extension and the loss of tissue by necrosis which results from its later and more extensive development.

1809 Chestnut st.

Apothesine, the New Local Anesthetic:

The Revised Technique of Pterygo-mandibular Injection.

By J. S. SHIELDS, D.D.S., Brooklyn, N. Y.

AT this time, when American chemical ingenuity is so sorely needed and its products are so carefully watched, I cannot refrain from reporting my observations of and conclusions from a series of over 700 oral operations under local anesthesia induced by the new American synthetic local anesthetic —apothesine. These operations were performed at the Vanderbilt Clinic of the College of Physicians and Surgeons, New York, during a period of two months, between November 9, 1917, and January 11, 1918. In a series of 380 cases, 703 extractions were done, 151 of which were anesthetized by infiltration by subperiosteal and peridental injections, the remaining 229 by conduction through perineural injection of the pterygo-mandibular nerve. There were also sixteen minor operations, including root amputations, removal of small cysts, fibrous tumors, and plastic operation to close the palate. In another series of cases there were twenty-five double pterygo-mandibular injections. The anesthetic solution in each case consisted of apothesine 2 per cent. and adrenalin 1:50,000. The solutions were prepared by dissolving one tablet of apothesine combined with adrenalin for every 2 cc. of Ringer solution used, and boiling the solution over an alcohol flame for sterilization. Profound anesthesia was induced in one minute when infiltration was the method employed, and it is even more noteworthy that when conduction was resorted to, the average time in which complete anesthesia resulted was eight minutes. Untoward symptoms such as pallor, syncope, or palpitation were conspicuously absent during the whole series. The anesthesia in each case was absolute, and in those cases that were observed an hour and a half after injection (impacted third molars) sensation had not yet returned. My observations with regard to the toxicity of apothesine and its non-interference with primary wound healing coincide entirely with those of Prof. Arthur Dean Bevan, president-elect of the American Medical Association, which he records in the Chicago *Surgical Clinics* of February 1917, in the following language: "I have recently used apothesine in twenty-five operations, including removal of inguinal glands, resection of rib, and drainage of lung abscess, circumcision, inguinal and femoral hernia, carcinoma of the face, synovial cyst on the back of the wrist, ligation of thyroid vessels, gastroenterostomy, resection of rib, and draining subphrenic abscess, a very extensive thyroidectomy, removal of bullet from the thigh, removal of infected cyst of the neck, and removal of tumor of the breast. We have used as large an amount as five and one-half ounces of a half of one per cent. solution. We have not noticed any toxic effects of any kind, and no interference with primary wound healing." Owing to apothesine's entire freedom from habit-forming properties, its purchase and sale is not restricted by any of the provisions of the Harrison narcotic law.

CHEMICAL COMPOSITION OF APOTHESINE.

To discuss technically the chemistry of apothesine is beyond the scope of this

paper. I shall attempt, however, to give the reader a conception of the structure of this substance which will be adequate for his purpose. Ever since the discovery of cocain by Niemann in 1859 and the subsequent demonstration of its anesthetic properties in 1884 by Koller, it has been the goal of chemists to produce synthetically a substance having the anesthetic power of cocain without its dangerous, poisonous character. In 1865 Lossin showed that cocain when split into its component parts consisted of benzoic acid, methyl alcohol, and ecgonin, a complex substance related to atropin. Future attempts at synthesis were based upon this analysis, and one principle which has since been shown to be an essential in the building of the molecule of a local anesthetic has been adhered to; that principle is the formation of an ester by combining an acid with an alcohol. Considered from this standpoint, cocain is the methyl-benzoyl ester of ecgonin. In 1897 Einhorn and Heinz made an important step forward, and produced orthoform, which is chemically the methyl ester of para-amino-oxybenzoic acid. By slight changes in the molecular structure of orthoform they subsequently evolved nirvanin, holocain, and acoin. In 1901 Ritsert made another important advance in producing anesthesine, the ethyl ester of para-amino-benzoic acid. Fourneau in 1904 and Impens in 1905 produced respectively stovain and alypin. Up to this time no synthetic local anesthetic answered all the requirements as promulgated by Braun, the father of local anesthesia. These requirements in effect are that the substitute should be relatively non-toxic, that it should not be inferior to cocain in anesthesia-producing power, that it should be non-irritating even to most delicate tissues, that it must combine with adrenalin without deterioration of itself or the adrenalin, and that it must be soluble in water and boilable. This ideal was approached in 1905 by Einhorn when he made the diethyl-amino-ethanol ester of para-amino-benzoic acid, or what is known as novocain. In this newest development, apothesine, it can safely be said that the goal has been attained, and we now have in apothesine the perfect local anesthetic. It differs from novocain in that instead of being essentially an ethyl ester of benzoic acid, it is a propyl ester of cinnamic acid. Thus, propyl alcohol is used instead of ethyl alcohol, and cinnamic acid in place of benzoic acid. In my hands it has fully answered all the requirements of Braun.

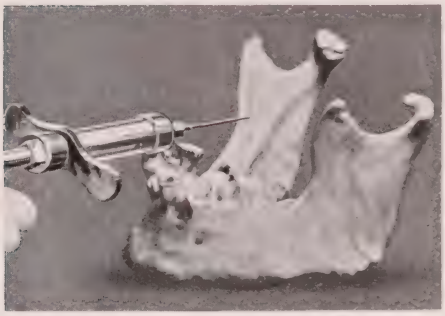
TECHNIQUE OF INJECTION.

The technique of inducing conduction anesthesia by injection of the pterygo-mandibular nerve can easily be acquired by practice. The operator must have a clear idea of the anatomy of the ramus of the jaw and the relations of the nerves and vessels on its inner aspect. To determine the site of puncture the index finger is placed on the external oblique line of the ramus and pushed posteriorly until the retromolar triangle is felt. (Fig. 1.) This triangle is formed by the sides of the internal and external oblique lines. If the finger be now raised until it is about one centimeter above the occlusal surfaces of the molars, the anterior border of the ramus is palpated. In this procedure of finding the site for puncture, the finger should be kept in constant contact with the tissues, and is to be swabbed, together with the surrounding mucous membrane, with tincture of iodin. The point of the needle is now placed upon the finger-nail of the guiding finger, and is carefully slid toward the mucous membrane. The needle must puncture the mucous membrane at a point high enough to avoid the internal pterygoid muscle. The needle is advanced until the bone is encountered, then slightly withdrawn to the submucous tissue, and borne over the internal oblique line to the inner aspect of the ramus. The hand and syringe are now moved mesially and the needle is again pushed forward, this time slightly outward, to conform with the direction of the inner surface of the ramus. When the needle has passed over the lingula it is in the pterygo-mandibular space, where the anesthetic solution

should be injected. (Fig. 2.) *The needle must be in contact with the ramus throughout its course from the internal oblique line to the pterygo-mandibular space.* I mount my syringe with a $1\frac{5}{8}$-inch needle on a short hub. Using a needle of this length with a short hub allows sufficient needle space between the mucous membrane and the hub, thus minimizing the danger of breaking the needle through the necessary bending. The needle should preferably be steel. This is important, because the necessary change of direction can more easily be made with a rigid needle. A platinum-iridium needle is more yielding, and therefore the surface of the ramus is adhered to with difficulty. A few drops of the apothesine solution should be injected at the point of insertion to anesthetize the lingual nerve. When the pterygo-mandibular space is reached, the remainder of the contents of the syringe is injected, and during injection a constant backward and forward motion is maintained. This is done to obviate the possibility of injecting the entire quantity into a bloodvessel. The anesthetic solution quickly permeates the trunk of the pterygo-mandibular nerve, and the characteristic symptoms of tingling and numbness of the cheek and lip appear. When the preliminary injection is made in the region of the lingual nerve, the side of the tongue also presents these symptoms. Apothesine acts so quickly that usually in five minutes the whole region supplied by the pterygo-mandibular nerve—the mandible, gums, pulps, etc.—is completely anesthetized.

I have not taken up the technique for the infiltration injections or the other conduction injections, because my methods do not differ from those of most operators.

Fig. 1.



Showing needle in the retromolar triangle.

Fig. 2.

Showing needle in the pterygo-mandibular space.

CONCLUSIONS.

(1) Apothesine is equal to cocain in anesthesia-producing power.

(2) It does not deteriorate when combined with adrenalin, nor does it impair the efficacy of the adrenalin.

(3) It does not irritate even delicate tissues.

(4) It produces anesthesia by infiltration in one minute, and by conduction in from five to ten minutes.

(5) It is boilable without deterioration, and is freely soluble in water.

(6) It is less toxic than any other known local anesthetic.

585 Jefferson ave.

Brief Review of Current Dental Literature.*

By L. P. ANTHONY, D.D.S., Philadelphia, Pa.

(Read before the Academy of Stomatology of Philadelphia, March 6, 1918.)

YOUR committee has asked me to present a review of the current periodical literature on the various aspects of the practice of dentistry, and in making this request the committee impressed on me the necessity for brevity more than any other feature. There was some question in my mind as to whether I should attempt to review the literature or simply present a summary of it in more or less bibliographical style, and because of this time limitation and because the field to be covered is so large, I chose the latter course, and shall attempt simply to give you a bird's-eye view of what has been published during the past few months.

I have therefore classified the contributions according to the various specialties rather than according to periodicals, and give under each classification the title of the article, the author, and the journal in which it appears, commenting briefly on those which may be considered worthy of special note:

OPERATIVE DENTISTRY.

"The Principles of Black's Cavity Preparation." R. R. BYRNES, DENTAL COSMOS, January 1918. A clear and concise exposition of the principles of cavity preparation as taught by the late Dr. G. V. Black.

"The Manipulation of Amalgam." THOMAS H. HINMAN, *Dental Items of Interest,* January 1918. Dr. Hinman stands high in the field of operative dentistry, and his paper will doubtless prove of interest and value to all operative dentists.

"Dental Treatment in the English Army." Captain W. L. CROCKER, DENTAL COSMOS, February 1918. A very interesting account of the author's experience in practicing general dentistry in the English army.

"Where Will We Place Gold Foil Among Our Filling Materials?" J. M. PRIME, *Minneapolis District Dental Journal,* November 1917. In this day of gold inlays, amalgam fillings, etc., the profession has been much inclined to neglect the gold foil filling, but Dr. Prime comes to the defense of the gold foil filling in an admirable manner, claiming that the gold foil filling is by no means a lost art, and that it will soon come to its own again.

PROSTHESIS.

"Impressions for Full Dentures." GEORGE H. WILSON, *Pacific Dental Gazette,* January 1918. The particular feature worthy of note in Dr. Wilson's article is that in spite of the popularity of modeling compound for taking impressions for full dentures, he is still firm in his belief that plaster is the best material for this purpose.

Dr. Wilson has also issued a revised edition of his well-known book on Prosthetics—"A Manual of Dental Prosthet-

* This review, covering the literature for December 1917 and January and February 1918, was prepared at the request of the Academy. It is the intention of the Academy to have similar reports prepared, say every two months, until the dental literature for the year is covered.

ics," by GEORGE H. WILSON, Philadelphia, Lea & Febiger, 1917.

"Methods of Taking Modeling Compound Impressions with the Mouth Closed and Under Normal Biting Strain." J. H. DREXLER, DENTAL COSMOS, February 1918. A very clear description of the Greene method of impression taking.

"Type *vs.* Temperament." NORMAN S. ESSIG, DENTAL COSMOS, September, November, and December 1917, and February 1918. A series of articles constituting a valuable contribution to the subject of prosthetic dentistry, in that it presents to the profession a definite system for the selection of teeth in making artificial dentures. Dr. Essig's system is based on the classification of three basal types of dentures, and by his method one is enabled to reproduce any type of teeth from combinations and variations of the basal types.

"Notes on Prosthetics." D. M. SHAW, *Dental Record,* February 1918. A continuation of an excellent series of articles covering the field of prosthetic dentistry.

"Practical Suggestions in Plate Work." F. J. SMITH, *Dental Review,* February 1918. A description of the technique of impression taking according to the Hall method.

ORAL SURGERY.

"Surgery and Diseases of the Mouth and Jaws." Major V. P. BLAIR, published by C. V. Mosby Co., St. Louis, and "Injuries of the Face and Jaw," by MARTINIER and LEMERLE, two noted French surgeons, published by Wm. Wood & Co., New York. Two text-books on oral surgery in which the more recent methods of treating war injuries will be found.

"The Histology and Pathology of Alveolar Abscesses and Diseased Root-ends." KURT H. THOMA, DENTAL COSMOS, January 1918.

"Impacted Lower Third Molars." C. EDMUND KELLS, DENTAL COSMOS, February 1918. The special feature of Kells' paper is the presentation of a method for cutting away a portion of the crown of a tooth impacted in a horizontal position, and then with specially designed forceps drawing the tooth forward into the space made by cutting away the crown and removing it with an elevator or the forceps. The author claims almost universal success with this system where teeth are impacted in a horizontal position, and says that there is seldom any necessity for after-treatment of the wound.

"Three Rare Cases of Replantation of the Teeth." ANGELO CHIAVARO, *Annali di Odontologia,* December 1917. Dr. Chiavaro advocates the same method of treatment, *i.e.* extraction and replantation, as that proposed by Marshall in his paper

"Apical Infection and Its Treatment," JOHN S. MARSHALL, *Journal of the National Dental Association,* October 1917 —both writers claiming abundant success in following this rather heroic method of treatment of chronic apical abscesses in selected cases.

"The Treatment of Root-canals with Putrescent Pulps." CARL J. GROVE, *Journal of the National Dental Association,* January 1918. A further elaboration of the author's ideas of strict asepsis and thorough cleanliness in root-canal operation.

Two other valuable contributions to this subject are—

"The Surgical Technique of Root Resection in Granuloma Cases." CARL D. LUCAS, *Dental Summary,* January 1918; "A Method of Filling Root-canals." I. L. FURNESS, *Dental Summary,* January 1918.

"Fractures and Dislocations of the Jaws." CHALMERS J. LYONS, *Dental Summary,* January and February 1918. A series of articles by a writer of considerable prominence on the treatment of fractures from various causes, which being written in more or less text-book style, will doubtless prove of considerable value to the student as well as to the practitioner of oral surgery.

As related particularly to war surgery, the following articles will be found valuable and instructive:

"Two Cases Illustrating Plastic and

Dental Operations." H. D. GILLIES, *Lancet,* December 1917.

"A Few Notes on the Treatment of Gunshot Wounds of the Mandible and Maxilla." W. KELSEY FRY, *Lancet,* December 1917.

"Healing of Lower Jaw-bone Defects in War Cripples." J. F. ESSER, *American Journal of Surgery,* December 1917.

"Cartilage Transplantation in Extensive Wounds of the Lower Jaw." M. MORESTIN, *Presse Médicale,* August 1917.

PATHOLOGY AND BACTERIOLOGY.

"The Present Status of Dental Bacteriology." K. F. MEYER, *Journal of the National Dental Association,* September 1917. With regard to the relationship of oral sepsis and systemic disturbances, Meyer says that the evidence is not convincing as to the exact relation of cause and effect, and adds that one should suspect the presence of pre-existing disease as an underlying factor in oral sepsis before resorting to mutilating dental operations.

"The Influence of General Health on Oral Tissue." LEROY M. S. MINER, DENTAL COSMOS, March 1918, presents practically the same phase of the question as Meyer, claiming that so far as the relationship of mouth and systemic conditions is concerned his experience has proved that mouth conditions are as often the result of systemic conditions as they are the cause, and in proof of his contention he presents numerous cases from practice in which mouth conditions have quickly cleared up after the correction of certain systemic disturbances.

"The Pathogenesis of Focal Infection." E. C. ROSENOW, *Journal of the National Dental Association,* February 1918. A further elaboration of the author's studies on the localization of bacteria. Rosenow presents numerous laboratory experiments which tend to further substantiate his original findings.

"Some Mucous Membrane Affections of the Mouth." M. L. HEIDINGSFELD, *Dental Summary,* February 1918. In this paper the author shows the desirability of co-operation between the dermatologist and the dentist, and describes a number of disease conditions of the skin with which dentists should be familiar.

"Pyorrhea." F. H. SKINNER, *Dental Summary,* February 1918. A detailed description of the writer's technique of instrumentation in connection with the Dunlop vapor treatment for pyorrhea.

STUDIES OF SALIVA AND THE INTERNAL SECRETIONS.

"The Relationship of Oral Secretions to Dental Caries." HERMANN PRINZ, DENTAL COSMOS, February and March 1918. Two of a series of articles by Dr. Prinz presenting a new theory with regard to the etiology of dental caries, his belief being that susceptibility and immunity to dental caries bear a definite relation to the salivary enzyme content, *e.g.* that persons with abnormal saliva are more susceptible to caries than those whose saliva is normal. The author presents a series of valuable scientific studies in support of his belief.

"An Experimental and Clinical Study of the Isolated Thyroid Hormone." NELSON W. JANNEY, DENTAL COSMOS, February 1918. An exceedingly interesting paper in that it presents a new theory as to the functions and correlations of the internal secretions.

ANESTHESIA.

"Nerve-Blocking." A. E. SMITH, *Minneapolis District Dental Journal,* November 1917. A paper along similar lines to the classic on this subject published by Dr. Hermann Prinz some years ago: "Modern Methods of Local Anesthesia," *Dental Review,* March 1913.

"Selection of Anesthetic for Oral Operations and the Roentgen Ray as an Aid in Diagnosis." KURT H. THOMA, DENTAL COSMOS, March 1918. A paper which should be helpful to the oral surgeon in the selection of the proper anesthetic for a given operation.

"The Comparative Efficiency of Local Anesthetics." TORALD SOLLMAN, *Journal of the American Medical Association,* January 1918.

"Why Chloroform is a More Powerful and Dangerous Anesthetic Than Ether."

our inability to comprehend fully the mechanism of heredity.

From our colleagues, mentioned above, we acquire the tendency to interpret changes or variability in terms of cause and effect. The principle is an excellent one, and a very convenient way in which to interpret nature. Yet I think the tendency of some practitioners has been to exaggerate the influence of mechanical forces on the individual; to some the body has become a mere ball of clay, easily molded in any direction. We must not forget that systematists, in explaining phylogeny on the basis of cause and effect or adaptation, speak in very general terms, and imply a great number of causes besides those mentioned, and also presuppose a great period of time in which the changes have come about.

To say that in the course of time the excessive heat and rays of the sun have caused the hair of the negro to become frizzly and his skin to become black is one thing, but to expect the sun to have a similar effect on an individual or even on a large number of generations within our own brief historical background is entirely different. The first statement could probably never be proved or disproved to one inclined to reject or accept it Yet, to the anthropologist, the negro is something more than a dark skin and frizzly hair; he is a biological problem. Closely correlated with these characters of skin and hair, we find a wide, short, flattened nose, short ears, thick lips, long limbs, large teeth, projecting face, a tendency to longheadedness, and a very definite form of skull and skeleton. In view of this great number of closely associated characters it seems hardly fair to segregate a single character and explain it by a single causal factor.

Again, the causes which we assign are necessarily limited by our experience and background. This accounts for the fact that we may have a score of different causes applied by as many workers explaining the same variation—and one is as likely to be correct as the other. It would be more probably correct to say that all these and many other factors enter into the causal complex. A short time ago it was noised about that the narrow-toed English shoes were rapidly causing the little toe of man to become vestigial. Sometime later, when the same dwindling little toe was found among the earliest Egyptian mummies and among tribes never encumbered with footgear, we felt relieved, and the English shoes were exonerated. This would seem to show that the most obvious reason is not always the real cause. Only last week I read a statement to the effect that the Chinese expended so much of their energy in growing a queue that they were unable to grow a beard. Now that the practice of growing a queue has been abolished, it has been predicted that the Chinese would speedily recover and develop beards. A glance at some other Mongolian and Negroid types discourages us from taking such a statement seriously.

INFLUENCE OF ENVIRONMENT ON THE DEVELOPMENT OF TYPES.

It is not my purpose to discourage the search for environmental influences. In fact, I believe that environment is a very important factor in evolution, especially when extended, as has been done by W. K. Gregory([2]), to mean internal environment as well as external environment. But these generalizations must be considerably modified before they are applicable to the individual. The extent of these influences is determined by the plasticity of the individual, which is regulated by growth. A fuller knowledge of the process of growth will help us to keep our theories of cause and effect, as applied to the individual, within the bounds of reason.

As an example of the malleability of the human body in infancy we may examine some of the types of head form produced by the American Indians by means of bandages and mechanical devices. In fact, the head is sometimes unintentionally deformed by the use of a hard cradle board.

The muscles undoubtedly leave their markings on the skeletal system; the conformation of joints is also influ-

enced by function. This skull of an Eskimo [exhibiting] illustrates both of these points. This individual had a misplaced premolar on the right side. For some reason or other it was evidently inconvenient for him to masticate on that side. The teeth show no perceptible traces of wear. Consequently he has shown a preference to use his left incisors and canines almost exclusively. In order to do this it was necessary to use the right internal pterygoid muscle more strenuously than the left. As a result we have a very much heavier condyle on the right side, and a much more sloping articular eminence bounding the right glenoid fossa. The markings of the temporal muscles also show well in this skull, being nearer to the sagittal suture here than in any skull yet reported on.

RACE THE CONTROLLING FACTOR IN THE DEVELOPMENT OF TYPES.

We come now to the other controlling factor which we call race. Among mankind we recognize at least three primary races of living man, Mongoloid, Negroid, and Caucasian, with a strong probability of the Australian constituting a fourth. Each of these primary races may be further subdivided into four or five fairly distinct racial types. Each race, and in turn each racial type, possesses a peculiar combination of characters by means of which we may recognize it from any other race or racial type. Certain individual characters may be common to two races, but not in the same combination. Some racial types present such a blending of characters that it is difficult to decide to which of two primary races they may belong. The Australian is a good example of this.

Certain characters seem to be fairly constantly confined to a single race—the woolly hair and short broad nose to the Negroid types, the peculiar fold of the eye and the broad face to the Mongoloid types, the light skin and well-developed beard and abundant body hair to the Caucasian. Other characters apparently jump racial boundaries and appear in more than one race. Stature, barring the extremes, is more distinctive of racial types than of race. The tendency to long- and short-headedness appears in all races, yet is very constant for racial types. The high-arched nose of the Semitic peoples is duplicated among North American Indians.

I shall not go into detail on the matter of race, but shall only attempt to draw a few examples a little nearer your special field. I have not made a detailed study of teeth, and can speak only in very general terms. We recognize racial differences in the size of teeth. It has also been shown that certain anomalies of the teeth occur more frequently in one race than in another. But after all I have said about the persistence of racial traits we should expect to find some of the same distinct racial differences in teeth that we find in other parts of the body. I know of only one well-established case. Dr. Hrdlicka has shown that the American Indian and Eskimo show very peculiar, infolded, shovel-shaped upper incisor teeth. This character, though less accentuated, occurs in the teeth of other Mongoloid types.

I have followed with considerable interest the persistent appearance of papers attempting to correlate tooth form with certain mental types, and the equally persistent attempts of other workers to show that no such correlation exists. If we accept these types as psychological types the thesis becomes absurd, but if we call them morphological types I believe the subject deserves further consideration. The attempt to correlate tooth form with biological types should not be abandoned until it has been demonstrated beyond any doubt that such a correlation does not exist.

RELATION OF THE DIFFERENT PARTS OF THE SKULL.

On two* occasions you have had presented to you one of the principles of comparative anatomy, namely, the principle of dolichocephaly and brachyceph-

*No attempt is made to reconstruct the extensive literature bearing on this subject.

aly extended to the form of the face and alveolar arch. It was first definitely formulated by Prof. H. F. Osborn(3). In 1905 Dr. E. H. Angle(1) applied similar concepts to man. In 1910 Dr. Raymond C. Osburn(4) extended Prof. H. F. Osborn's principle to man. These papers have shown beyond any doubt that there are distinct differences in the conformation of the dental arch among normal individuals.

The principle of dolichocephaly (long-headedness) and brachycephaly (short-headedness) assumes that all parts of the skull are in harmony. If the brain-case is long and narrow, the face, including the alveolar arch, will be correspondingly long and narrow. The reverse would be true in a skull having a short, wide brain-case. It also asserts that the component parts, such as the teeth, zygomatic arch, etc., will conform to type. The whole principle is so simple, logical, and plausible that I became interested in it. If such a relationship existed between the several parts of the skull the principle presented great possibilities in our analysis of race. Like most proposals which reduce biological phenomena to simple compensating interactions, this principle seems to be far from universal in its application. It is very probable that the scientists mentioned above would not claim so much for the principle at the present time.

I am not prepared to speak in any detail on the subject. I have simply looked into the matter in its broader aspects, and have confined my inquiry to the main proportions of the brain-case and face, including the alveolar arch. The accompanying Table I gives us an opportunity to compare the main proportions of the brain-case with the main proportions of the alveolar arch. Both of these indices express the proportion of breadth to length in terms of per cent. That defining the brain-case is called the cranial index, and the one expressing the proportions of the alveolar arch is called

TABLE I.—COMPARISON OF LENGTH-BREADTH INDICES OF BRAIN-CASE AND ALVEOLAR ARCH.

Race.	Cranial index.	Maxillo-alveolar index.	Observer.
1. Australian	71	109	Turner.
2. Tamil	71	113	Sarasin.
3. Vedda	72	117	"
4. Kaffir	72	107	Shrubsall.
5. Eskimo	73	124	Oetteking.
6. Singhalese	73	108	Sarasin.
7. Indian, New York	74	116	Hrdlicka.
8. Tasmanian	75	115	Berry.
9. Old Egyptian	75	118	Oetteking.
10. Maori	76	123	Bauer.
11. Indian, Virginia	76	115	Hrdlicka.
12. Scotch	77	113	Turner.
13. Swede	77	113	Duben.
14. Indian, California	77	115	Hrdlicka.
15. North Chinese	78	124	Reicher.
16. Kalmuck	81	125	"
17. Buriat	84	125	"
18. Tirolese	85	118	Wacker.
19. Tourgout	85	126	Reicher.
20. Telenget	86	124	"

the maxillo-alveolar index. In either case a small index denotes a relatively long, narrow structure, and a high index the reverse.

The cases selected represent fairly well the ranges of the two indices in man. Inspection of the table shows a loose relationship between the two indices. The long-headed Australian and Kaffir have an elongated alveolar arch; at the other end of the scale the Mongoloid Buriat, Tourgout, and Telenget have a wide alveolar arch. Yet there are numerous discrepancies. The North Chinese, with a relatively longer head, have a very short, wide alveolar arch; the Eskimo, with an elongated head, have a short, wide arch. The proportions of the arch among American Indians and among the Mongols proper seem to remain fairly constant, regardless of differences in head length. While there are cases in which the brain-case and alveolar arch are in harmony, it would seem that the correlation is too loose to be of any service to a practitioner. To my mind the racial relations are more significant than the relationships of brain-case and alveolar arch. Race implies more than dolichocephaly and brachycephaly.

In Table II, I have compiled the relationship of the absolute measurements of the alveolar arch and the brain-case and face. These show a fairly constant relationship throughout.

But just as I said that it is impracticable for the dentist, orthodontist, or physician to apply the broader principles of comparative anatomy to the individual, it is equally impracticable to apply the generalizations of the anthropologist.

CORRELATION OF MEASUREMENTS OF THE DIFFERENT PARTS OF THE SKULL.

Coming down to the individual, I have attempted to determine which of these measurements were more closely related, and to what extent any two of the dimensions varied together. This is called correlation. The basis of comparison is unity, or 1. Unity denotes a perfect correlation. For example, if we should find that the width of the palate always varied with the width of the brain-case, and at the same proportionate rate, the coefficient of correlation would be 1, *i.e.* we should have a perfect correlation. Perfect correlations are rare. Orthodontists and dentists must apply some such method in order to obtain accurate working principles. Rather than be satisfied with the generalization that a long palate always accompanies a long brain-case, we can determine mathematically with some degree of certainty in how far such a statement is true.

In my investigation I have confined myself to one sex. The differences between male and female are very large in

TABLE II.—COMPARISON OF ABSOLUTE MEASUREMENTS OF PALATE WITH ABSOLUTE MEASUREMENTS OF BRAIN-CASE AND FACE.

(Palate measurements expressed in percentage of the diameters of brain-case and face.)

Race.	Greatest length of palate to greatest length of brain-case.	Greatest width of palate to greatest width of brain-case.	Greatest width of palate to greatest width of face.
Eskimo	29.5 per cent.	45.0 per cent.	44.0 per cent.
Telenget	30.5 " "	42.0 " "	46.0 " "
Singhalese	31.0 " "	46.0 " "	48.0 " "
Kaffir	30.0 " "	46.0 " "	47.0 " "
Tamil	29.5 " "	48.0 " "	50.0 " "
Vedda	28.0 " "	46.0 " "	47.0 " "
Tasmanian	30.0 " "	47.5 " "	50.0 " "

some racial types. The observations on the Eskimo were made on a series in the American Museum of Natural History, and are from Alaska. The measurements on which I based my calculations for the Telenget and Kaffir were taken from Reicher([6]) and Shrubsall([7]) respectively. I fully realize that orthodontists rarely come in contact with individuals of these racial types. The selection was necessitated in order to obtain a homogeneous series of any considerable size.

The measurements used were—

(1) *Cranial index*—Greatest breadth of brain-case. Greatest length of brain-case.

(2) *Maxillo-alveolar index* — External breadth of alveolar arch; external length of alveolar arch.

(3) *Greatest length of brain-case*—Glabella to Opisthocranium.

(4) *Greatest breadth of brain-case*—Euryon to Euryon.

(5) *Base of brain-case*—Basion to Nasion.

(6) *Breadth of face*—Maximum Bizygomatic.

(7) *Length of face*—Basion to Prosthion.

(8) *Greatest breadth of palate*—External.

(9) *Greatest length of palate*—External.

TABLE III.—CORRELATIONS.

INDICES.

I. Cranial Length-breadth Index with Maxillo-alveolar Index. (Proportions of brain-case with proportions of alveolar arch.)

Eskimo....[36M]	Coefficient of correlation	.18 ± .11
Telenget...[40M]	" " "	.13 ± .10
Kaffir.....[36M]	" " "	.11 ± .10

MEASUREMENTS OF LENGTH.

II. Greatest Length of Brain-case and External Palatal Length.

Eskimo....[47M]	Coefficient of correlation	.70 ± .04
Telenget...[43M]	" " "	.19 ± .10
Kaffir.....[38M]	" " "	.26 ± .10

III. Base of Brain-case and External Palatal Length.

Eskimo....[47M]	Coefficient of correlation	.52 ± .07
Telenget...[43M]	" " "	.39 ± .09
Kaffir.....[38M]	" " "	.35 ± .09

IV. Length of Face and Length of Palate.

Eskimo....[47M]	Coefficient of correlation	.90 ± .02
Telenget...[43M]	" " "	.63 ± .07
Kaffir.....[38M]	" " "	.76 ± .05

V. Length of Brain-case and Base of Brain-case.

Eskimo....[47M]	Coefficient of correlation	.62 ± .06
Telenget...[43M]	" " "	.58 ± .07
Kaffir.....[38M]	" " "	.68 ± .06

MEASUREMENTS OF BREADTH.

VI. Greatest Width of Brain-case and Greatest Width of Palate.

Eskimo....[47M]	Coefficient of correlation	.07 ± .10
Telenget...[43M]	" " "	.36 ± .09
Kaffir.....[36M]	" " "	.00

VII. Width of Face (bizygomatic) and Greatest Width of Palate.

Eskimo....[47M]	Coefficient of correlation	.40 ± .08
Telenget...[43M]	" " "	.31 ± .10
Kaffir.....[36M]	" " "	.53 ± .08

VIII. Greatest Width of Brain-case and Greatest Width of Face (bizygomatic).

Eskimo....[47M]	Coefficient of correlation	.45 ± .08
Telenget...[43M]	" " "	.41 ± .02
Kaffir.....[36M]	" " "	.15 ± .11

The number of cases is very small and the error correspondingly large, yet these figures give an approximation to the relationship.

We get no certain correlation for the indices. Length of brain-case and length of palate show a fair degree of correlation among the Eskimo only. There seems to be a fairly constant relationship between the base of the brain-case and length of palate. A much higher degree of correlation is shown between the length (not height) of the face and length of the palate. But this is a spurious correlation, inasmuch as the length of the face includes the length of the palate. An elongated palate adds to the length of the face.

In the measurements of breadth we find no certain correlation between width of brain-case and width of palate except for the Telenget. The most constant relationship is between width of the face and width of palate. I feel more certain about this correlation, inasmuch as it agrees rather closely with the results of Wissler and Channing([8]) in a more detailed study of the palate. The width of the face and width of brain-case show a positive correlation for the Eskimo and Telenget. It would seem that in these instances the head and face vary together; yet the proportions are reversed. The transverse diameter of the head exceeds the transverse diameter of the face in the Telenget, while the reverse is true for the Eskimo.

DEVELOPMENT OF THE INDIVIDUAL NOT CONTROLLED BY THE BIOLOGIC FACTOR WHICH DETERMINES TYPE.

These correlations bring out a very important point in biological research. The factor originally giving rise to and determining a biological type does not wholly determine the development of the individual. Certain developmental and environmental factors may enter into the growth of the individual, and in some cases cause him to depart in certain characters from the mean of the biological type of which he is a member. But it is also apparent that these individual variations are limited by the factors which determine biological types. Thus a generalization which applies to a racial type does not necessarily apply to an individual member of that type. It naturally follows that we cannot generalize from a study of one or two individuals of a given type. I think it is also clear, from what has been said, that we should not expect to find many laws which are universal in their applicability. It has been demonstrated on several occasions that there may be a very high degree of correlation between two given structures in one racial type, and only a very loose correlation between the same two structures in another racial type.

The reason that our results are discordant with those of the comparative anatomists is that they have spoken of the skull as a whole. Dolichocephaly and brachycephaly have not been confined to the brain-case. The length of the head has been measured in such a way that it includes the face, and consequently the palate. The correlation, as stated by them, has been spurious.

If we examine the data of Oppenheim([5]) on a fair series of primate crania we find the same discordant results we found for man himself.

TABLE IV.—COMPARISON OF PROPORTIONS OF ALVEOLAR ARCH WITH PROPORTIONS OF BRAIN-CASE. (A large index denotes a relatively wide, short head, and a wide, short arch respectively.)

Primate.	Cranial index.	Maxillo-alveolar index.
Hapale	72	108
Lemur	73	68
Cebus	76	96
Cercocebus	79	67
Hylobates	79	77
Theropithecus	80	60
Cynocephalus	80	67
Mycetes	80	82
Semnopithecus	82	92
Gorilla	82	65
Chimpanzee	84	81
Macacus	85	73
Orang-utan	88	75

Hapale shows the longest brain-case and the shortest alveolar arch. Cebus shows the same condition in a less marked degree. Macacus, Gorilla, and Orang show a relatively short, wide brain-case and a very elongated palate. The following table shows the relationship of the absolute measurements; the most constant relationships are in the measurements of breadth:

TABLE V.—COMPARISON OF ABSOLUTE MEASUREMENTS.

(The diameters of the palate are expressed in terms of percentage of the diameters of the brain-case.)

	Palate length to brain-case length.	Palate width to brain-case width.	Palate width to face width.
Hapale	41 per cent.	61 per cent.	56 per cent.
Cebus	46 " "	58 " "	50 " "
Semnopithecus	54 " "	58 " "	48 " "
Lemur	85 " "	77 " "	58 " "
Hylobates	62 " "	60 " "	50 " "
Mycetes	80 " "	81 " "	54 " "
Macacus	75 " "	64 " "	50 " "
Cercocebus	80 " "	63 " "	47 " "
Chimpanzee	58 " "	56 " "	45 " "
Cynocephalus	82 " "	62 " "	45 " "
Orang-utan	76 " "	64 " "	42 " "
Gorilla	75 " "	60 " "	39 " "

It would seem, then, that the principle of dolichocephaly and brachycephaly, in itself, is not sufficient to explain the variation in the form of the alveolar arch. The statement has been made that the teeth conform to the skull rather than the skull to the teeth. It is clear that if we would accept this statement we must distinguish between the brain-case and the facial skeleton. All parts of the skull are not necessarily in harmony. In dealing with the individual, at least, it is apparent that the face may vary independently of the brain-case. As to how far the face determines the teeth or the teeth the face I am not prepared to state. It does not seem essential to say which is the cart and which the horse. It is safer to say that the dental arch and face vary together in respect to width.

This subject presents opportunities for the orthodontist to render service to anthropology. In your research on teeth you can add to our knowledge if you would attempt to study them in relation with other parts of the body. That there are possibilities has been shown by Mr. Leslie Spier of the department of Anthropology in this museum. In a study of a series of palate casts, collected in Porto Rico by Prof. Franz Boas, Mr. Spier has shown that the teeth may serve as an index of physiological development. His results show that individuals who are slow in erupting a given tooth are likewise behind their fellows of the same chronological age in stature and weight. In a recent number of the DENTAL COSMOS a practitioner has called attention to an apparent susceptibility of blond individuals to dental caries. Such subjects are deserving of more detailed study.

SUMMARY.

The principal points I have attempted to make may be summed up as follows:

Racial differences do exist. There are differences in tooth form and in the proportions of the dental arch. There is no

a priori reason to assume that these differences occur sporadically, and are not confined to racial or morphological types. The subject deserves more detailed study before it is abandoned.

It should also be borne in mind that the loose generalizations of comparative anatomists and anthropologists are of little value to the practitioner except in so far as they may furnish him a broader point of view. Apparent correlations within a group are not necessarily real when applied to the individual. Absolute interrelations are rare in biology, as are also principles which are universal in their applicability. In our conclusions on cause and effect we should remember that the variability and plasticity of the individual are modified by factors of growth and the determinants of biological types.

Finally, I believe physical anthropology offers much to orthodontia in the way of methods. The differences with which you are dealing are so slight that they necessitate accurate mathematical treatment and description. Such statistical treatment should be a means to an end, and not the end. In other words, we should use mathematics as a means of describing more accurately and determining the extent of the relationship between different parts of the body, but we should not look to the human body to provide us with mathematical problems as such.

In conclusion, I repeat my belief that both sciences can profit from a closer co-operation between orthodontists and anthropologists. The collections of the American Museum of Natural History are always at your disposal for study. We are always ready and willing to co-operate with you in any possible way to further scientific research.

BIBLIOGRAPHY.

(1) Angle, E. H. "The Upper First Molar as a Basis of Diagnosis in Orthodontia," American Society of Orthodontists, 1905.

(2) Gregory, W. K. "Genetics *vs.* Paleontology," *American Naturalist*, vol. li, 1917.

(3) Osborn, H. F. (*a*) "The Phylogeny of the Rhinoceroses of Europe," *Bull. Amer. Mus. Nat. Hist.* xiv, 1900. (*b*) "Dolichocephaly and Brachycephaly in the Lower Mammals," *Ibid.* xvi, 1902.

(4) Osburn, R. C. "The Effects of Brachycephaly and Dolichocephaly on the Teeth of Man," Dental Cosmos, May 1910.

(5) Oppenheim, S. "Zur Typologie des Primatencraniums," *Zeit'ft f. Morphol. u. Anthropol.*, vol. xiv, 1912.

(6) Reicher, M. "Untersuchungen über die Schadelform der alpenländischen und mongolischen Brachycephalen," *Zeit'ft f. Morphol u. Anthropol.*, vol. xv, 1913.

(7) Shrubsall, F. "A Study of A-bantu Skulls and Crania," *Journ. Anthropol. Inst.* n. s., vol. i, 1899.

(8) Wissler and Channing. "The Hard Palate in Normal and Feeble-minded Individuals," *Anthr. Pap., Amer. Mus. Nat. Hist.*, vol. i, pt. v, 1908.

77th st. and Central Park West.

[See also *Discussion*, as reported under "Proceedings of Societies," this issue.]

Importance of Dental Supervision During Pregnancy.

By J. CLARENCE SALVAS, D.D.S., Philadelphia, Pa.

(Read before the Academy of Stomatology, at its regular meeting held January 4, 1918.)

THE two following communications from physicians serve to illustrate the difference of opinion with regard to the care of the mouth and teeth during pregnancy:

Dear Doctor,—Mrs. A. informs me that she is suffering from a back tooth. As she is pregnant I advise her that she must not visit the dentist or have anything done to her teeth, unless it be merely to relieve the aching tooth. You understand the seriousness of the situation, and therefore if you will avoid doing anything but what is absolutely necessary to make her comfortable I will greatly appreciate it.

Yours truly,

December 5, 1913. ———

My dear Doctor,—I am sending Mrs. B. to you. I wish you would attend to the condition from which she is suffering. As near as I can make out it is the upper second molar. Please note the condition of the gums; probably you can suggest a remedy to relieve the excessive bleeding, which while not harmful to her, is very annoying. She has just come from her family dentist, who refuses to assume any responsibility, and confines his treatment to stuffing cotton in a (rotten) tooth, and expects it to remain there for three months. I beg to remind you that I am responsible for mother and child. You keep her mouth and teeth healthy and you will be a valued co-worker in this case. Nothing is more exasperating than dental disorders during the weeks when a woman is confined to her bed, in more or less of a critical condition.

Yours truly,

March 2, 1914. ———

These two communications need no comment. They speak for themselves. We cannot but be impressed, however, with the fact that our modern understanding as to the proper treatment of the mouth and teeth during gestation is very different from what it was some years ago, when it was the general belief that the mother must sacrifice a tooth for each child—a preposterous thing to say the least, but the impression was so strong in the medical and dental professions that it finally communicated itself to the laity. This has been a most difficult fallacy to dislodge, not only from the minds of the profession but the laity as well, and has led to the loss of a great many teeth which might otherwise have been saved, to say nothing of pain, general discomfort, and bad hygienic conditions that might have been avoided. During the past few years I have had a great many of these cases, many of which were attended in conjunction with the obstetrician in charge of the case.

Clinical observations lead me to classify the conditions prevalent during gestation into two classes, each requiring specific remedial measures, and each being due to entirely different influences.

First: The environmental conditions

produced by vomiting during the first months of gestation, which is the period of susceptibility to caries. There is little or no gingival inflammation, or hypertrophy, or congestion of the gum tissue.

The treatment calls for the most stringent preventive measures and the maintenance of a vigorous oral asepsis. The sulci of the teeth, the interproximal spaces, and the free margins of the gums, become filled with masses of organic matter which rapidly undergo putrefaction and fermentation, creating an ideal medium for the inception of dental diseases. The importance, therefore, of prompt, vigorous attention is obvious. My first treatment, therefore, is confined to thorough prophylaxis, scrupulously removing all deposits and polishing the surfaces of each tooth, using the orange-wood points charged with finely powdered silex and sodium bicarbonate. This is followed with a warm solution of iodin and potassium iodid, used as a spray under high pressure; through its germicidal properties this solution destroys the spores and parent cells in albuminous material, which it readily penetrates, and stains any remaining bacterial plaques. This first treatment is concluded with a vigorous massage of the gums, using the index finger and the thumb and a paste of equal parts of sodium bicarbonate and boric acid to which has been added cinnamon water and a few drops of myrrh.

Vomiting during gestation seldom occurs after the fifth month, but during this time weekly treatments are arranged wherever possible, or until the conditions are under complete control, when they may be given monthly. The second treatment is given the following week, when prophylaxis is again instituted, and the mouth and throat sprayed with a warm salt solution to which has been added a little vinegar. This solution is most effective in removing from the oral cavity and throat mucus or mucin that has become saturated with particles of decomposed matter. A searching examination is then made. Devitalized teeth are radiographed, carious tissues are carefully treated, and all weakened or threatened surfaces protected; that is to say, the deep sulci of the molars and bicuspids, after adjusting the dam, are washed with absolute alcohol, sterilized with phenol, and black copper cement is packed in to one-third of their depth. Should the lingual surfaces of the molars and bicuspids manifest any signs of impending danger, as they frequently do, they are coated with a sticky mix of white copper cement. I have a number of cases at present where the buccal and labial surfaces of the incisors, cuspids, bicuspids, and molars have been treated in this way. It is astonishing how long cement smeared on the surfaces of the teeth will sometimes last.

Second: In the next classification, or where there is no vomiting, the systemic condition is manifested orally by hypertrophy or tumefaction of the gum tissues. At times the congestion is so great that the tissues will cover the entire labial surfaces of the lower incisors and bicuspids, and the impact of mastication will cause marked hemorrhages. In these unusual conditions it is necessary to limit prophylaxis to the parts of the mouth not affected.

The treatment consists first in inducing artificial arterial hyperemia, which is best accomplished by massage. I might add here that no treatment is so valuable as massage for improving the blood supply, for encouraging metabolism, in short, for toning up the tissues, which means in other words a checking of the waste and the establishing of that vital resistance necessary to resist bacterial activity. The tissues are then touched with 20 per cent. silver nitrate. The excessive swelling is best controlled with trichloracetic acid, merely touching the margins with the small point of a wooden pick dipped in the drug, and traced along the margins of the swollen gums. After from three to five treatments the venous engorgement disappears, and the tumefied gum tissues due to stasis will give place to normal. In these conditions there is no exudation or involvement of the pericemental membrane, and when the conditions are once under control

they can be kept in check by monthly prophylactic treatments.

Strange as it may seem, these two conditions—that is, the hypertrophied and congested condition of the gums and the decalcification of the tissues of the teeth during the months when nausea periods prevail—do not appear in the same mouth. It is either one or the other, and in a greater or less degree. I have come to believe, however, that the keynote to the whole situation is the alteration or creation of conditions surrounding the teeth, rather than any functional disturbances in the organic structure of the teeth themselves, and while we do not know all we should about the conditions which influence these oral manifestations during pregnancy, yet we are certain of one thing, that strict and vigorous prophylaxis is favorable to the limitation of dental disorders.

1907 CHESTNUT ST.

[See also *Discussion*, as reported under "Proceedings of Societies," this issue.]

The Conservation and Utilization of Cicatricial Bands in the Treatment of Jaw Fractures Involving Extensive Loss of Substance.

By MM. GERNEZ and LEMIÈRE,

CHIEFS OF MAXILLO-FACIAL SURGERY AND PROSTHESIS OF THE THIRD REGION, FRANCE.

(Abstract of a paper published in *l'Odontologie* for February 1918.)

THE authors describe three varieties of cicatricial bands which are most often formed in connection with extensive tissue destruction around the jaws:

(1) *Intermaxillary bands:* Bands between the maxillæ and mandible.

(2) *Interfragmentary bands:* Bands between the bony fragments.

(3) *Intermandibulo - tegumentary bands:* Bands between the mandible and the skin.

Contrary to the ideas generally accepted before the war, they propose a form of treatment having for its purpose both the preservation and even the encouraging of the formation of these tissues, which formerly it was sought to eliminate.

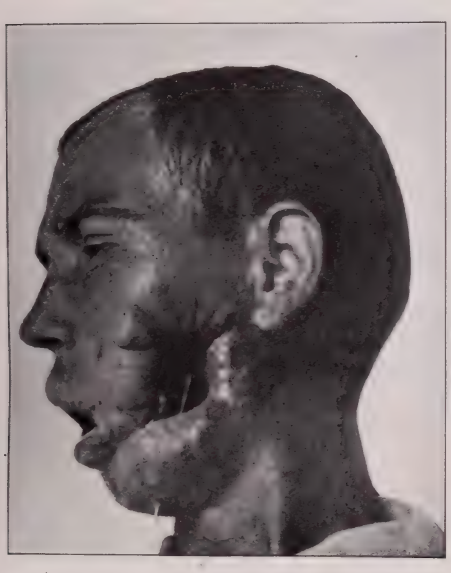
These neoformations, in their deep parts, are utilized together with mechan-

FIG. 1.

I, Intermaxillary bands. II, Interfragmentary bands. III, Intermandibulo-tegumentary bands.

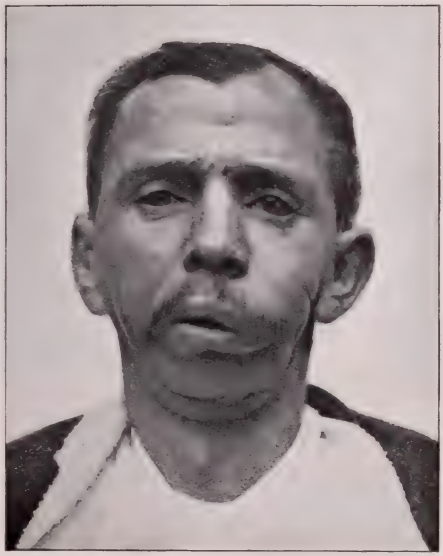
ical devices (rods, guides, springs, etc.) to obtain a new masticatory apparatus giving the maximum of efficiency, while the superficial or cutaneous parts of the

Fig. 2.



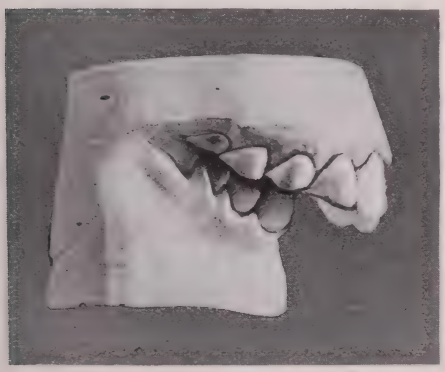
State of patient at his arrival one month after being wounded, with the following lesions: (1) Loss of substance of the ascending ramus and of the body of the mandible. (2) Palatine perforation involving the posterior third. (3) Loss of the left border of anterior half of the tongue. (4) Loss of central region of left cheek. (5) Submaxillary fistula, with drainage.

Fig. 3.



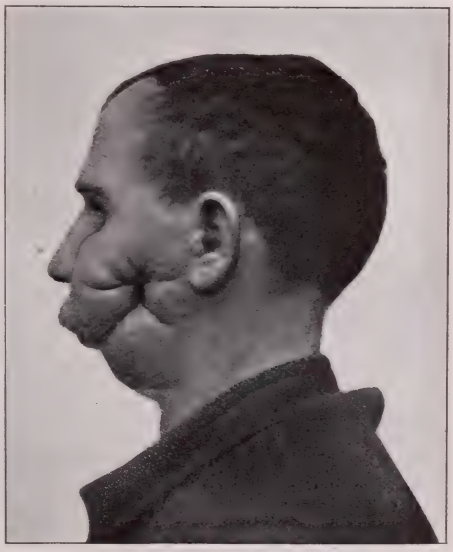
Front view of face.

Fig. 4.



Casts showing the condition of the occlusion. Retrognathism of the lower jaw, 2 cm.

Fig. 5.

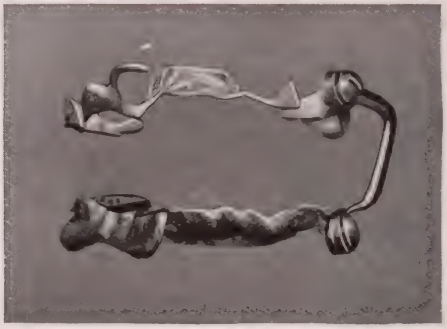


Showing the formation of the superficial cutaneous cicatricial bands. These deep star-like cicatrices are dissected and sutured at the time of the plastic operation.

cicatricial bands are suppressed, and autoplastic operations, allowing the gliding of the tissues one over the other, permit a restoration of the facial contours.

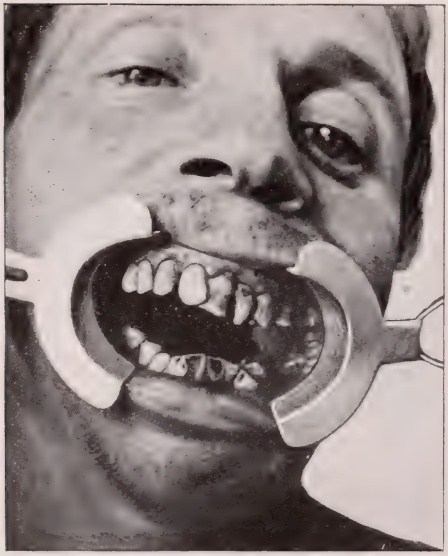
This method has the advantage of giv-

Fig. 6.



Apparatus with elbow joints allowing three articulations, and anchored to the upper jaw for the purpose of—(1) Bringing the anterior fragment into normal. (2) Occlusion. (3) To overcome incontinence of saliva, and to aid pronunciation.

Fig. 7.

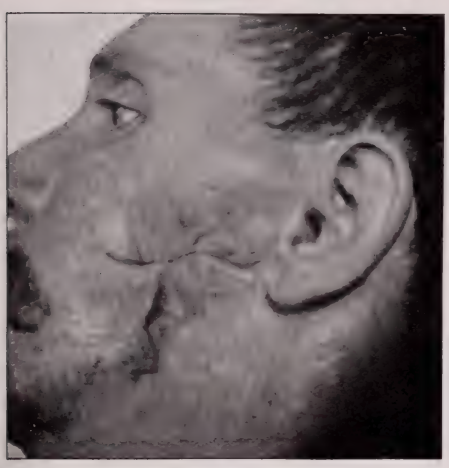


Shows imperfectly the deep intermaxillary cicatricial band, the presence of which will facilitate greatly the action of the apparatus.

Fig. 8.

Occlusion obtained by the reduction apparatus.

Fig. 9.



Condition of cheek after the autoplastic operation. The pliability of the integument will permit a graft either of fat or of bone with periosteum attached.

Fig. 10.

Front view of face.

ing, in general, firmer pseudo-arthroses, the masticatory forces are better coordinated, and the esthetic results are more satisfactory.

Report of a Case of Follicular Dental Cyst.

By R. E. DENNEY, D.D.S., Philadelphia, Pa.

(Read before the Academy of Stomatology of Philadelphia, at its regular meeting, January 4, 1918.)

I HAVE been asked to report a case of follicular dental cyst in the mouth of one of my patients, a boy of ten, that came under my observation recently. He was brought to me because of a slight swelling on the right side of the face, which his mother attributed to some dental cause. There was a history of a dental abscess in this region about a year previous, following a blow on the face, but at this time the abscess had disappeared. The swelling was first noticed by the mother about a month previous to her consulting me. About a week before, there had been a profuse hemorrhage from the nose. There had been no pain but the swelling and the hemorrhage prompted her to seek treatment.

Upon examination I found that the swelling extended from the upper right deciduous cuspid to the first permanent molar. Above the deciduous cuspid there was a fistula much larger than we find in connection with ordinary dental abscesses, with the appearance of having an active discharge from it, although

upon pressure on the hardened swelling there was no discharge. In looking about for a cause, the only tooth I could suspect was the second deciduous molar, which had been devitalized and filled. The first bicuspid was erupting. The deciduous cuspid above which the fistula was located was unfilled, and apparently normal. As the time was approaching when the second deciduous molar and the deciduous cuspid would be shed, I extracted them, hoping that one of these might be the cause of the trouble, but as I did not feel satisfied that they were the sole source, I had the patient return in three days. The swelling still appeared to be about the same, as did the fistula. I then had roentgenograms made, and found a cyst extending from above the deciduous cuspid back to the first permanent molar. The unerupted second bicuspid, which was calcified to a point just above the crown, was turned almost upside down from the pressure of the cyst, the occlusal surface pointing upward. The partly developed root of the first bicuspid projected into the cyst cavity, a layer of bone about the thickness of the crowns of the teeth holding them in place.

I referred the case to Dr. Thomas Aller for operation. He found the cyst had cut off practically all nourishment from the two bicuspids, and removed those. He also found something the roentgenograms did not clearly show, namely, that the partly developed cuspid lay entirely within the cyst cavity, and it also was removed. The lining of the cyst was removed in one piece, thus preventing recurrence. I saw the patient about two weeks after the operation, Dr. Aller in the meantime treating the case, when I found that the cavity had closed somewhat but was still quite large, the lower part of the opening being about the size of the end of my first finger, and connected through the antrum with the nose. This was evident from the boy's speech, and from the discharge of mucus into the cavity. I also found a large unmasticated pea well up in the cavity. This suggested the necessity of some appliance to prevent the impaction of food in the cavity, so I made a small vulcanite plate extending from the lateral to the first molar carrying three teeth to replace those that were lost, and held in position by cast clasps around the molar and the lateral, being careful not to have the rubber extend into the cavity and prevent its closing.

I saw the case recently, six months after the operation, and the cavity had healed perfectly. The mother said that it had completely closed in four months, and the spraying had then been discontinued.

The operation was a success and the patient lives, but three teeth that should have been perfectly good are now lost beyond recall. We know that a follicular dental cyst is a sac lined with epithelium, filled with fluid and containing a normal or abnormal tooth, and is the result of the abnormal development of the dental follicle. What causes the abnormal development we are by no means sure, nor do I feel that I can add any definite information on that point. But when we have a history of a dental abscess in this same region, when there is present a devitalized tooth which could be the only cause of that dental abscess, and the area that this dental abscess has occupied being within the area occupied by the cyst, the finger of suspicion points accusingly to that devitalized tooth as the starting-point of the cyst. This should cause us to view with much distrust the practice of retaining for orthodontic or other reasons deciduous teeth or roots of deciduous teeth that we definitely know to be diseased.

609 Flanders Building.

[See also *Discussion*, as reported under "Proceedings of Societies," this issue.]

Traumatism Due to Faulty Co-ordinating Bridge Work.

By PAUL R. STILLMAN, D.D.S., New York, N. Y.,
DIRECTOR OF INSTRUCTION IN THE DEPARTMENT OF PERIODONTIA, COLUMBIA UNIVERSITY, NEW YORK.

(Read before the union meeting of the District of Columbia Dental Society and the Maryland State Dental Association, Baltimore, June 6 to 8, 1917.)

THERE is an ancient adage which bids the cobbler stick to his last, which axiom is founded on common sense. It might likewise appear that a specialist in any particular branch should refrain from criticism of other branches of his subject; that he should adhere to his own line, leaving to others who have practical knowledge and experience any expression of disapprobation. But while the cobbler may not be a tanner, he must be able to recognize and procure good leather in order to successfully ply his own trade.

In these days of many specialities it is difficult to draw a positive line of demarcation, so constantly do our subjects overlap and so close is their interdependence. The periodontist beginning a case must accept or reject much that is the work of specialists in other branches, and it is the shortcomings of the results in bridge-work restoration which he most frequently finds deplorable.

A realization of the growing importance of the subject of the reciprocal relations of the jaws, the occlusion of the teeth as it applies to every dental prophylactic measure and to the articulation of bridge work in particular, is my justification for this paper.

It is quite the universal custom among those who make bridge work to ignore the practical application of those accurate measurements of the jaws which are so necessary to successful results in all dental restorations.

The theoretical principle of substituting for lost natural teeth certain artificial appliances by attaching them to healthy abutment roots is undoubtedly sound. It is the ultimate idea, in my opinion, for the restoration of dental function. That cases so treated are followed by disaster, that they are productive of disease, and even death, does not prove that the idea is fundamentally incorrect.

In every form of scientific discussion differences arise as to that which is correct and that which is not. The tests of time and usage will in the end show favor to one idea or principle, to the exclusion of all others. This is as it should be, for it is by our allegiance to that which has proved good in both theory and practice that scientific advancement is made possible.

The practice of crown and bridge work is at present undergoing a very commendable revolutionary stage in its development. New systems and technique have been introduced by various men who have recognized the necessity for greater cleanliness in mouths where bridges were a necessity. Certain forms of removable bridge work appear to have solved the problem of sanitation. Conservation of the normal pulp and the construction of supplied dummies which represent true anatomical tooth forms is yet another most commendable advance. Nevertheless the utterly inefficient and worthless type of fixed bridge represented by a row of flat-back porcelain facings suspended between two-piece shell or Richmond crowns is still a familiar sight. This type of bridge, with its grotesque occlusal surfaces, has always been a men-

ace to hygiene, and the only excuse those who still produce such bridges can offer is that they were taught the method in their college days twenty years ago.

The periodontist cannot with propriety criticize adversely any of the several types of bridges or crowns which are approved by the authorities on this subject, nor the methods and systems of procedure which enter into their construction. It is not the intention of this paper to open discussion on any other phase of bridge or crown restorations than that which, in the co-ordinating relation of the jaws in the function of mastication, causes trauma of the pericementum and its pathological sequelæ.

PROPER OCCLUSION A NECESSITY IN BRIDGE WORK.

There are certain fundamental essentials in bridge work which apply equally to all operations for the restoration of lost occlusal surfaces of the teeth, whether by bridges, crowns, inlays, fillings, or plates, viz, that the occlusal surfaces which are supplied must co-ordinate with the antagonizing surfaces in the opposite jaw. Nature has produced for us the plans we are to follow in the restorations which we make for the teeth, and she protests against such work as does not prove up to her requirements, or when these restorations violate her laws, by instituting certain pathological processes in the supporting structures.

That there is a physiological movement of the teeth in the alveoli during normal function is generally admitted; the investing structures are singularly elastic, otherwise attachment by ankylosis in primates would be fatal. That there is a movement of the teeth during the function of mastication accompanied by malacia is also here affirmed. The normal movement is physiological, always slight, does not increase, and is necessary to prevent fracture when marked stress is applied in the occlusion; while the latter is pathological, and is frequently accompanied by evident rarefaction and dental periclasia. The physiological movement of the teeth is not easily discernible, as the change of the approximal relation is extremely slight, even when considerable force is applied. The pathological relation or traumatic occlusion is easily discernible; it is a relation due to a faulty co-ordination of the occlusal surfaces. The term traumatic occlusion has been defined by the American Academy of Periodontia as follows—"A perversion of the occlusal relations of the teeth when in use, whereby an excessive stress is brought upon one or more antagonizing teeth." It is an acquired condition, and among other phases is the one I wish to bring to your attention tonight. It may be acquired at the time of the insertion of bridge work and inlays, and is always as fatal in the one case as in the other unless the proper relief is obtained.

The prosthodontist finds that any violation of the laws of dental articulation which has to do with co-ordination in function is fatal to the practical success of the artificial denture. Certain difficulties were encountered in the old days, prior to the introduction of anatomical articulation, chief among them the embarrassing knowledge that a plate would adhere to the mucous membrane surfaces upon which it was intended to rest only so long as the mandible was passive; just as soon as the function of mastication was attempted the plate would become confused with the food bolus, and this resulted in a mastication *of* teeth instead of *by* teeth, as was intended. Many of these dentures, which in their adaptation to the mucous surfaces were valve-tight as to fit, showed a perverse instability when put into service.

The bridge worker encounters no such unsteadiness after cementing a bridge to place. The bridge is set securely upon two or more abutment teeth or roots, which are presumed to be in normal health. Dynamic stress even at this time is discernible. It is not to be expected that a bridge will gyrate as will a plate, which has no abutments to hold it in the mouth; not for a while at least, not until these abutment roots have been literally broken from the alveolar process through exactly the same incorrect mechanical stress relation as in the case of the plate.

The exodontist really believes that a vast majority of teeth are diseased, and should be extracted, for it is his experience that most cases which are referred to him actually do need such treatment, while the periodontist seldom sees a case of dental periclasia having bridge work but that it is necessary to remove—and thus destroy—the bridge in order to proceed with the treatment. Many a handsome and exquisitely made bridge has brought a smile of virtuous pride to the operator and of satisfaction to the patient when it was cemented to place, but there are no laughs and congratulations passed around when the abutments of the bridge have been finally destroyed through septic periclasia, and it falls into the hands of the periodontist for removal.

USE OF THE ANATOMICAL ARTICULATOR IN BRIDGE WORK.

The specialty of bridge work seems to be noticeably unorganized, and the methods of practice quite empirical. Other branches in dentistry which require special talent and training both in the academic and technical aspects, such, for instance, as orthodontia, radiodontia (roentgenology), periodontia, etc., have their own organizations which are devoted to the advancement of their several branches; they have journals and published proceedings of their meetings which are national in their scope, and which exert a wide beneficial influence toward a unification of ideas and a standardization of technique. There are nearly a dozen men of my acquaintance who make bridge-work restoration the major branch in practice, yet their individual ideas as to what should be accepted as standard and what should not would represent almost as many separate ideas as there are individual practitioners. There may be many, I hope there are, who construct all bridges and crowns upon the anatomical articulator, and who practice the same scientific methods in producing co-ordination in the occlusal relations of bridges as do those prosthodontists who construct full dentures upon the principle which Gysi has exemplified for dentistry. I repeat, there may be many, but, if so, the fact has never been brought to my notice. In the case of bridge workers it would appear that the necessity for the proper use of the anatomical articulator seems to be less important to them in an inverse ratio as it appears important to the periodontist.

The scientific procedure of anatomical articulation is a standard method of determining just what the true relation of the teeth should be for each case. One who expects to accomplish satisfactory results in bridge work should discard the antiquated "rule of thumb" in articulation, and apply these scientific principles. He should adopt the anatomical articulator, with its possibilities for accurate measurements, in ascertaining the true relation of the condyle path to the plane of occlusion. He should apply the face-bow, which will determine just where the casts upon which he expects to build a bridge must be placed in relation to the measurements from condyles to incisors, and he should never set any bridge where co-ordination of the occlusal surfaces of the teeth in mastication has not first been fully proved to be accurately normal.

The prosthodontist who does not employ this method in the construction of a denture will have a very high percentage of failures. To be sure, the steps necessary for the construction of a plate upon these principles increase somewhat the expense of production, but the constant necessity of remaking cases which have resulted in failure becomes almost *nil*.

DENTAL PERICLASIA THE RESULT OF TRAUMA.

Dental periclasia has its most frequent and immediate contributing factor in trauma of the pericementum, trauma which is communicated to the investing tissues by an improper relation of the teeth in occlusion. These vascular investing tissues depend upon cell regeneration—a never-ending metabolism—for their existence. When trauma is induced the food supply to these structures

is inhibited, malnutrition and unbalanced waste-removal follow, vital resistance is lowered, and any break in the integument at the subgingival space is quickly followed by infection.

Normal tissue never becomes infected. There must first occur certain changes which make the tissue pathologically receptive, as well as some break in the integument where the infecting organisms may enter. This is true in regard to the infection of tissue which supports the teeth, as elsewhere in the body. In traumatic occlusion the elastic gingival attachment of the dental ligament becomes gradually weakened, and finally literally torn from the cervical cementum, opening the subgingival space for the ready entrance of detritus. In such an environment the mouth flora find an ideal culture medium and a ready passage. Normal gingival epithelium has a very high resistance to all micro-organic life, as have all the mucous surfaces of the whole alimentary tract; but when these structures have sustained a prolonged irritation from a constant and determined pounding with every closing of the jaws they become exhausted, and the natural resistive forces are found too debilitated and disorganized to repel attack. The symptoms of occlusal trauma are to be observed in mouths perhaps years before the resistance of the investing structures have become so lowered that they become a prey to infection.

The mouth may at times be utterly neglected in so far as its sanitation is concerned, it may even tolerate the presence of badly fitting crown bands, with their usual accumulations of septic débris, such a state being endured for years without evidence of periclasia, but let a beautifully carved occlusal inlay or filling be inserted, where zeal for the artistic has resulted in an abnormal cusp relation, or let a piece of bridge work or a single crown be placed in such a mouth and the reciprocal relation of the occlusion disturbed, and forces are at once set up which result in tissue dystrophy and infection. This would indicate that the immunity of these tissues was sufficient in the one case, where the resistance was high, due to the normality of the occlusal relation, and insufficient in the other, where the abnormal stress relation with its accompanying interference with coordination has reduced the tissue resistance by traumatic occlusion.

Periodontists find bridge work of every conceivable type in the mouths of their patients. A description of some of this should be suppressed, as considered unmentionable in polite dental circles; we will therefore let it pass. A reasonable percentage of this work, however, reveals at a glance that it is the work of the earnest, skilful, and painstaking type of practitioner who comprises the large majority of our profession. Let me present a typical case: Overlooking for the moment the well-nigh fatally diseased condition of the stumps which are acting as the holding abutments, let us observe the bridge itself. One can well imagine the satisfaction of the dentist when the piece was received from the laboratory quite finished and mounted upon the little plaster-of-Paris cast representing the segment of the jaws which was so generously included in the impression. One can see at a glance that the porcelain facings are not checked, nor has the solder, which has been so skilfully flowed over the backings and the conventional occlusal swagings, any pits or blowholes. The reinforcement by extra plate and solder makes the shell crowns rather difficult to remove. There is an evident honesty throughout its whole composition. The shade selection of the porcelains is excellent and these have been ground to fit the gum contour with precision. The buccal resemblance to teeth is striking. This seems as far as we can go in commendation or compliment, for the occlusal surfaces are quite untooth-like in both outline and form. And the lingual surface—there *is* no lingual surface! From the lingual cusp to the buccal cervical border there is just a smooth inclined plane to encourage the tongue in its efforts to dislodge food particles. This surface has been called a self-cleansing surface, an example of misnomer of the most pronounced type. Study models of such a case would reveal that all of the

occlusal contact stress had been concentrated upon the bridge, for the abutments are loose and elongated, due to a thickening of the pericementum by occlusal trauma; they are also septic. It is today a professional crime to set a bridge such as I have described. Infection about the abutments must as inevitably follow in this case as in that of the tooth with a root-canal which has been filled with absorbent cotton. This particular kind of result in bridge work is the outcome of unquestioning allegiance to antiquated methods, together with a disregard and ignorance of the anatomical movements of the mandible.

The making of study models as a forecast of treatment in restoration is a common practice among many of the more advanced practitioners. These study models are typical orthodontic casts, which are occluded in their true relations. Prognosis for the necessary anatomical restorations may thus be studied at leisure, and the scheme definitely decided before treatment is begun. The taking of impressions of finished cases for the purpose of making casts for criticism of one's own results is a practice which is indulged in by a very few; yet were this a customary practice, what an infinite improvement would soon result! Diagnosis for prophylaxis in such cases as these would reveal traumatic occlusion, if present, and much harm could thus be prevented. Were the results of these failures of bridge work through this fault apparent after a few days or weeks instead of after several years of unsatisfactory service; were the symptoms which are induced of a painful and inflammatory character from the very first, this paper would never have been written —for, like the prosthodontist, the bridge worker would have definite and immediate trouble on his hands, and the remedy would have been adopted simultaneously with its introduction into the plate work.

LIMITATIONS OF THE DENTAL LABORATORY.

The practice of employing laboratory assistants or of sending cases to the public laboratories is good, provided one obtains competent workmanship. It must be remembered that these so-called mechanical dentists can only supply technical help; that they have no academic knowledge of the anatomy of the parts which are undergoing repair, nor do they even have an opportunity to observe in practical service the appliances upon which they work. That they frequently have skill in their work which exceeds that of the dentists who employ them is obvious. But so has the bricklayer superior technical skill to that of the architect, and so it should be. That the laboratory man's results are ever a failure is largely the fault of those who employ him. It has been said of the alarm clock that to be successful with its use one must know more than the clock.

In investigating the relation of the dentist to the public laboratory I have found that it is customary for the dentist to send to the laboratory impressions which include never more than the lateral half of the jaw; that the articulator used is of the hinge principle type, or else what is known as the "back extension" is used in place of an articulator, the latter having but one movement, lifting apart as a cover lifts from a box.

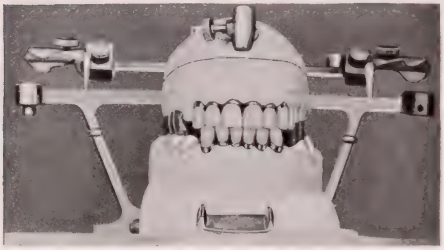
It is necessary, in order to obtain results which are satisfactory, to have a full impression of both jaws, and to have the casts poured in some material which has sufficient hardness on the occlusal edges to withstand attrition while the case is being articulated. The antagonizing cast should never be made from a wax bite, but from a cast made from an impression, and the upper and lower casts then assmbled upon the anatomical articulator with the aid of the face-bow.

REQUISITES OF PERFECT BRIDGE WORK.

Bridge work should resemble the natural teeth in so far as it is possible. Correct measurements of the crown diameters should depart from the true measurements but slightly, if at all. Lingual surfaces are of greater importance to the function of mastication than the buccal and labial, and they should

be reproduced with greater care. Where there is great loss of alveolar tissue in the bicuspid and molar region, lingual *roots* should be carved upon these surfaces to lighten the weight of thickness, never departing from the true anatomical forms which nature has adopted, and

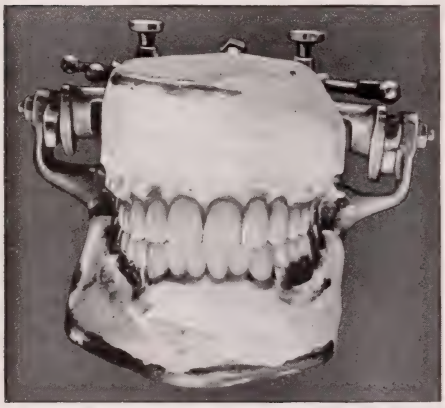
Fig. 1.



which are fundamentally the correct ones.

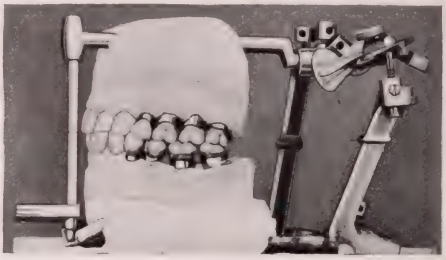
The anatomy of the temporo-mandibular joints varies in every individual, as does the shape of the ears of each individual head. Its development as to form is greatly influenced by the erupting ar-

Fig. 3.



rangement of the natural teeth in their occlusal relations. Cases of unilateral deformities in malocclusion exhibit marked differences in the curve of the condyle path in this articulation. Certain maxillary habits are formed in each case previous to the loss of the teeth, and in any successful restoration of these lost teeth these facts should be acertained and taken into consideration. Normal arrangement of the teeth in bridge restoration will not be tolerated in certain cases of this type when the maxillary habit is greatly interfered with.

Fig. 2.



There are certain names to which credit for research in this work should be given, for it is by the labor of such men as Bonwill, Snow, Gysi, and Williams particularly, and many others, that this science has been developed. The writer does not claim that there has been suggested here anything original, but he does assert that the anatomical articulator has been used in these cases and found successful.

The name of Peeso is almost as familiar to the bridge worker as is the work itself. Dr. Frederick A. Peeso has recently published a text-book entitled "Crown and Bridge Work," which is a complete working compendium for this field. If the plea which I have made here has not impressed you with the gravity of the situation, I can do no better than to quote from the writings of this master of the subject. He states:

> Another fundamental to crown and bridgework success was brought to the fore when a few scientifically inclined earnest workers, in an effort to make more effective artificial dentures, began a careful study of the various movements of the mandible during mastication. The object of these efforts was to devise a contrivance to accurately reproduce these movements so as to enable the dental workman, when mounting artificial teeth, to secure a more normal occlusion. Heretofore if the upper and the lower teeth articulated

with each other when the mandible was at rest, the work was deemed satisfactory, notwithstanding that the dentures were ineffective in mastication, owing to the fact that all the teeth met only when the mandible was in the rest position. At other times but few teeth were in contact. The immediate result of these investigations was a better understanding of the mechanism of mastication, and a higher appreciation of the importance of normal occlusion that has since reached all departments of our profession.

By occlusion is understood a rubbing or grinding surface contact of all the masticating surfaces of the teeth during all the movements of the mandible, as is always the case with the natural teeth in their normal position. Articulation is a mere fitting together in one position only.

This understanding of occlusion brought to the fore an imperfectly recognized cause of failure of many dental bridges. With the mouth closed, the teeth on these bridges fitted the opposing teeth accurately, but during mastication they touched at a few points only. Except for this fact these bridges might have given many years of excellent service, but owing to defective occlusion the force of mastication was concentrated upon a few teeth, which resulted in literally pounding the structure to pieces in a short time. In other cases the stress set up a destructive irritation in one or more of the supporting abutments, which just as surely resulted in the bridge failing. We know now that it is impossible for any one tooth to be unduly strained during mastication or other movements of the mandible if the occlusion of the denture has been properly adjusted, be it a plate, a crown, or a bridge.

This work of Peeso's is of such importance in the literature of bridge work that I will also take the liberty of quoting from this same source—from his chapter headed "Articulation." He states:

In crown and bridge work the question of the occlusion is of most vital importance, as the stability and life of the work depends to a very great extent upon its proper occlusion with the opposing teeth. In all cases of bridge work it is absolutely essential that only first-class anatomical articulators, capable of reproducing the natural lateral or triturating movements of the mandible, so necessary for perfect mastication, should be used. . . . Nearly all of the small so-called crown articulators on the market are absolutely worthless so far as securing good results are concerned. With these articulators the only movement possible is simply the up and down, or the opening and closing of the mandible. . . . In the majority of cases . . . . the face-bow should be used to serve as a guide to mount models properly on the articulator.

The time has arrived when our profession is being looked upon as a group of scientifically trained men who have as their fundamental idea the prevention and cure of all disease which has its inception within the confines of the mouth. To be accredited with less would be abhorent to every ethical practitioner. To be *producers of disease* instead of physicians, to be *destroyers of teeth* instead of dentists, to be *artisans* instead of *surgeons,* is the very antithesis of our aspiration. So, if there has been a distressingly high percentage of failures in our bridge work, let us all get together and see that this stain on the escutcheon of the best profession in the world is wiped out. Let all among us who have at heart the high ideals of our profession either correct the practice of using a hinge articulator or quit making bridge work.

115 Broadway.

Indirect-Direct Gold Inlay Method.

By M. J. WAAS, D.D.S., Camden, N. J.

(Read before the Academy of Stomatology of Philadelphia, at its regular meeting, January 4, 1918.)

WHEN invited to appear before you this evening the suggestion was offered that I touch upon some "high point" of interest, and it occurred to me to speak about the "high point" usually present in gold inlays made by the indirect method, and a means of avoiding this.

Both the direct and the indirect methods have distinct advantages, and the method I wish to present to you, which may be called the "indirect-direct," I believe retains and combines the greatest number of advantages of each of the separate methods.

After the cavity is prepared it is given a very slight coat of lubricant, and a Roach cup of suitable size selected and trimmed to approximate shape for the case in hand. A piece of thick tin foil is placed over the hole in the bottom of the cup where the handle of the holder comes through so the impression material cannot touch it while hot and its removal from the cup after chilling is thus made easy. The shaped cup is then filled with softened impression material, preferably Lochhead's, and pressed firmly to place, where it is immediately hardened by a spray of cold air or water. This material hardens very quickly, takes a very sharp impression, and becomes so hard that one cannot remove it without fracture if there are any undercuts in the prepared cavity. Base-plate gutta-percha is then inserted in the cavity and the patient dismissed.

This impression is then invested in order that the amalgam model may be packed under pressure. A rubber ring is set on a glass slab, filled with quite thick plaster, and the impression pressed down to place. It does not have to be invested deeply, as a small base is all we need with which to handle it. I use silver amalgam; any high-grade silver amalgam is suitable. In fact, copper amalgam can be used and may be reused, but it is not so hard as the silver, does not stand the polishing so well, and leaves a deposit on the inlay. This deposit, however, can be removed in an acid bath; but I prefer the silver amalgam.

To begin the packing, the amalgam must be very soft, quite "sloppy" in fact, packed in small pieces, and the excess mercury removed by pressure, using bibulous paper. Drier amalgam is then added under very strong pressure and the well in the plaster filled level full. After the amalgam is hard, the rubber ring is slipped off, the plaster investment broken away, and the impression and amalgam model separated with the aid of hot water. The amalgam model is then washed with soap and water, dried, trimmed to shape, and the cavity painted with a very thin film of lubricant—castor oil 1 part, and glycerin 2 parts. It is then filled with inlay wax to approximately the proper shape.

This wax model is now removed from the amalgam and tried in the patient's mouth, trimming with a lancet at the contact point in a compound cavity until it goes to place. The contact with the adjacent tooth or teeth is now established, and from the fit it can be determined whether the original impression was accurate or otherwise. Then ask the patient to close the teeth together very lightly, and note where the wax

model is too high. Take a large egg-shaped burnisher, warm in the alcohol flame, and touch it to the high point in the wax. This softens the wax. Now have the patient occlude the teeth again, and repeat this until the wax model is entirely down. The occlusion is now established. Remove the wax inlay carefully, replace in the amalgam die, and carve to correct anatomical form.

The next step is to add a very narrow ribbon of wax over all the edges, melting it on with a very delicate spatula, being careful to avoid leaving any very fine feather-edges. This I consider quite important, as it gives a bulk of material over all the edges. When the wax is burned out, the gold very easily casts to all points, and the surplus can be removed in the finishing process. Place the sprue at some point where it will not mar the contact or occlusal surface, and cast. After casting, place the inlay in the amalgam die and swage to place with moldine. Burnish, disk, and polish, and the inlay will go to place a completed operation without the necessity of any further finishing in the mouth, if each step has been correctly carried out. One should be careful to hold the inlay firmly in place under considerable pressure for three minutes while cementing to place, so that it will not be forced up by the expansion of the cement, and thus interfere with the occlusion.

By this indirect-direct method we have retained the advantages of the direct method in so far as we have established accurately our contact and occlusion in advance of casting, and we have gained the following advantages over the direct method:

We can carve the inlay to anatomical form very much better in the amalgam die than in the mouth, and do it at our leisure, without detaining the patient. We do not have to grind, disk, or polish it in our patients' mouths, for which they are always very grateful. We can see our fit, particularly at the cervical margin, in advance—something we do not see in the direct method in most instances; and further, an M.O.D. cavity, a very difficult one at best to make accurately by the direct method, becomes by this method just as easy as any other.

We have thus retained every advantage of the indirect method *plus* the fact that it has received in advance the approval of the supreme court of occlusion, the Mouth!

315 South Fifth st.

CORRESPONDENCE

A Case of Tooth Gemination.

To the Editor of the Dental Cosmos:

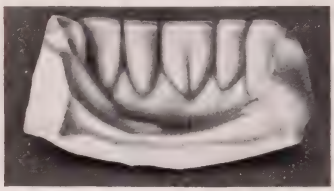
Sir,—The accompanying pictures illustrate a case of an unusual confluence of the lower central incisors. The patient is about forty years of age; mouth in fairly good condition. The teeth are all present, except the lower third molars, which may be either impacted or altogether absent; the upper ones are quite diminutive. Articulation good.

Labially (Fig. 1) the confluent incisors show a slight line where the teeth have united. This line or groove is altogether absent in the incisal third of the crowns. Incisally, no line of demarcation is present, the incisal edge being perfect.

The lingual surface (Fig. 2) appears more like that of an upper central incisor, the cingulum being almost perfect.

Fig. 1.

Fig. 2.



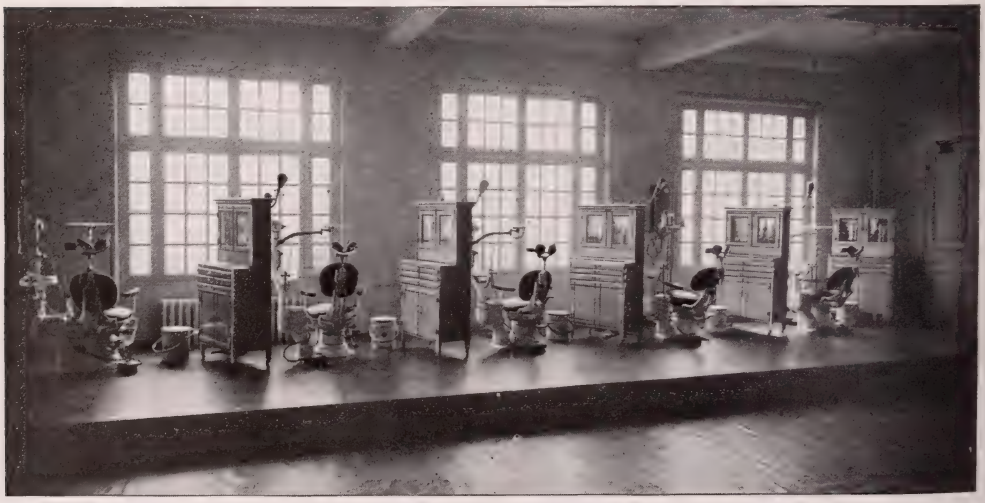
The patient had never been to a dentist, but his teeth, except for a slight deposit, were in good condition—a remarkable case of immunity.

Yours truly,

C. W. Batcheff, D.D.S.

Chicago, Ill., February 13, 1918.

DENTISTRY AND THE WAR.



Operative dental section of the American Ambulance Hospital of Paris, Neuilly-sur-Seine, France.

Proceedings of Societies

Eastern Association of Graduates of the Angle School of Orthodontia.

Regular Meeting, held in New York City, Saturday, January 26, 1918.

A REGULAR meeting of the Eastern Association of Graduates of the Angle School of Orthodontia was held on Saturday, January 26, 1918, at the Museum of Natural History, New York City.

The meeting was called to order at three o'clock, by the president, Dr. F. T. Murlless of Hartford, Conn., in the Osborn Library.

The PRESIDENT. Before taking up our regular program Professor Osborn will address us.

Prof. H. F. OSBORN. *Mr. President, and members of the society,*—It is a great pleasure to welcome you to the Osborn Library. I have just told your president that this is in a sense a baptismal ceremony, as this is the first meeting of any kind that has been held in this room since it has been enlarged and refitted.

In thinking over the purposes of your society, I recall the fact that my own first studies in teeth were made in the Royal College of Surgeons in London, with a wonderful collection which was brought together by the distinguished founder of British comparative anatomy, Dr. John Hunter. Hunter was succeeded by Richard Owen, and his studies carried on by Owen culminated in Owen's "Odontography." That was the pre-Darwinian period, a period in which teeth were considered as isolated types, with little idea of genetic relationships. I fancy the last work of that kind was the volume by Dr. Tomes, with which you are all familiar —the last work, and a very conservative one, of the older odontography.

The foundations of the new odontography were really laid by Professor Edward Drinker Cope, in 1880, on large collections of teeth which include types that we estimate to extend over a period of three millions of years in the earth's history.

It is very striking that there is a uniform fundamental pattern running through these basal eocene teeth. They look extraordinarily alike in one important feature, no matter to what order of animals they belong, carnivores, herbivores, frugivores, or insectivores; it is this feature to which Cope gave the name *tritubercular*. Cope's studies then led him back to a brief survey of the teeth of early mesozoic time, many æons preceding the basal eocene epoch, and he conceived the idea that in the Jurassic epoch there were antecedent forms. He thus glanced at the sources of the tritubercular type of molar and also contributed to the knowledge of the evolution of the tritubercular type in other lines of animals.

I made a long journey to the museums of Europe to verify the mesozoic origins of the tritubercular molar. Trituberculy also fascinated me in studying some of the early types of primate teeth of the middle eocene epoch of North America,

and I was led to the paper entitled "Evolution of Mammalian Molar Teeth To and From the Triangular Type." That was my first expansion of the Cope tritubercular theory. It has been developed and applied to every order of the mammals by different workers, by Cope, Dr. Wortman, and myself, by Dr. Matthew of the American Museum staff, and notably by Dr. Wm. K. Gregory.

With the co-operation of Dr. Gregory my various essays and observations, extending over a long period of years, were collected into the volume entitled "Evolution of Mammalian Molar Teeth," and I take great pleasure in inscribing a copy of this volume to each member of this association, in memory of your assemblage here and as an indication of the welcome which we extend to you and the pleasure with which we anticipate the results of your researches.

Mention of the names of a number of physicians—John Hunter, Joseph Leidy, and Richard Owen himself, who was trained as a physician—is of interest because it shows that in the early days comparative anatomy was the avocation of the physician, which led him away more or less from his professional studies into new scientific directions.

There has been unfortunately among students of human anatomy heretofore not sufficient recognition of the value of comparative anatomy, and similarly among comparative anatomists an insufficient recognition of the great value of the opportunities afforded to men like yourselves in human anatomy and human odontology. I understand one of the objects of this meeting is to bring together the two lines of study and observation, human and comparative, which have been so long divorced, and I am sure it will be pregnant with very important and interesting results.

The President. I am sure we all appreciate the hearty welcome Professor Osborn has given us, and am confident we shall each be pleased to receive his book, and shall treasure it.

Dr. Gough. I move a hearty vote of thanks to Professor Osborn, not only for his book, but for the talk he has given us this afternoon. (Motion carried.)

Louis R. Sullivan, M.A., then gave a lecture on "The Bearing of Physical Anthropology on the Problems of Orthodontia." (Illustrated by museum specimens.)

[This paper is printed in full at page 305 of the present issue of the Cosmos.]

DISCUSSION.

Dr. Milo Hellman, New York. I have nothing to offer in discussion that would add value to the paper itself. I wish nevertheless to express my appreciation of the subject and the manner in which it is treated. The method employed in the presentation of the data involved is in my estimation an inspiration to those who do research work. I have done a little bit in that direction myself, and therefore appreciate keenly the efforts of the essayist, for it is almost staggering to realize the amount of work entailed in the elaboration of a paper of this kind.

With reference to race, I may state that besides other physical characteristics, there is a certain type of occlusion prevalent among different races. For instance, in investigating the occlusion of the orang, it was found that there are two distinct types of occlusion; thus, the molar and premolar series occlude in a similar manner to that in man, under normal conditions, while the incisors will either be in an edge-to-edge relationship or the upper incisors will extend considerably forward over the lower.

In the description of primitive skulls many scientists utilize as an anthropoid characteristic the edge-to-edge occlusion of the incisors, conveying, of course, the impression that there is no other manner of incisor occlusion in the ape. This, however, is erroneous according to the above evidence.

In man, like conditions have been found to exist in different races. In the examination of a large number of human skulls, of the Mongolian and Indian races, the Mongolian dentition was found to exhibit a considerable overbite in the

incisal region. Sometimes it is not really extensive, but apparently very marked, because the lateral incisors of the upper jaw are invariably longer than in any other race. They usually occupy a position on a horizontal plane with the centrals and the canines, or even below that. This gives an appearance of considerable overbite, although the actual lapping of the upper teeth over the lower is not marked.

The Indian race, on the other hand, seems to exhibit an edge-to-edge bite almost universally. I have looked over between 2000 and 3000 skulls, and found this relationship to be almost characteristic of the Indian dentition. With the increase of age in the Indian, the edge-to-edge bite and the extensive wear of the teeth in general seem to produce an effect that would suggest the idea that the lower jaw is pushing forward. This manifestation is prevalent only in old age.

Also a difference in form of the glenoids and condyloids has been noticed in these two races. In the Mongolian, the condyloid process is narrow and long, while in the Indian it is oval, showing that they have a wider sweep of the jaw during functional activity. The glenoid of the Indian is consequently more shallow than in the Mongolian. These are, in the main, the characteristics observed that may be associated with the race.

In conclusion, I wish to state that it has been a considerable gratification to me to have heard this paper, and to learn the methods employed in the presentation of such scientific subjects. I am in hope that some day, with the help of Mr. Sullivan, I shall be able to bring to your attention some interesting material bearing on this subject.

Prof. H. F. Osborn. The conclusions reached by Mr. Sullivan are quite similar to the ones reached by Dr. Gregory in reference to the general harmonic lengthening or broadening of the skull. A very simple way of illustrating harmonic lengthening is to take a sheet of rubber and mark the principal points on the sheet; then draw that sheet out from the brachycephalic length to the dolichocephalic length, and you will find a perfectly harmonic result; it will be proportionately elongated. While we do find in the lower skulls that there is that general harmonic tendency, there is local disharmony very often, so that you get the same results as Mr. Sullivan has pointed out here. You get those striking disharmonies which sometimes are local in the cranial vault.

Another point which is interesting to surgeons, is that in the harmonic broadening of the skull entire areas are involved—the bones are very much broadened in that region, and operators for mastoid troubles find much more difficulty in operating on a brachycephalic than a dolichocephalic skull. Surgical operators are influenced by that, and I have been told that operators dread to operate on a brachycephalic skull, because there is more breadth of bone there to go through.

Dr. W. K. Gregory, New York. With regard to the general correlation of proportions in the skull, I have noticed a number of cases among extinct races of mammals where a general antero-posterior lengthening of the skull, as Professor Osborn said, would show a more or less harmonious lengthening of all of the parts, including the dentition; but I have also noticed that it was not a uniform percentage of lengthening throughout the skull, but that some parts would elongate more rapidly than others—I mean in a chronological series, where you can trace the history of each part. In fact, in one case which I investigated thoroughly, I did not discover the same increment in length throughout the skull, but I found that some parts increase faster than others, which is what one might expect. In this race (*Dolichorhinus*) of herbivorous mammals, the face, palate, and teeth took a larger part in the general lengthening of the skull than the basi-cranial region. In a distantly related genus (*Telmatherium*) the skull as a whole was also lengthened, but the increments of the different parts were quite different from the first set. One would feel that while there is a general harmony between the different parts of

the skull, yet there is also a certain measure of individual independence of the several parts.

Mr. Sullivan (closing the discussion). As to harmony and disharmony, there has often occurred to me this probability in explanation of the case of the Eskimo, for instance. The Eskimos are undoubtedly Mongoloid in their affinities. Our conception of the original Mongoloid was an exceedingly broad-headed and short-headed type. The Eskimo now has departed from that. The brain-case is increased in length, and the width has probably decreased, while the face has remained stationary. I think that is a plausible explanation, if the Eskimo is from the true Mongoloid stem, and if the true Mongoloid stem was brachycephalic.

(To be continued.)

Academy of Stomatology of Philadelphia.

Annual Meeting, held Friday, January 4, 1918.

THE annual meeting of the Academy of Stomatology was held in the Arcadia Café, Philadelphia, Pa., on Friday, January 4, 1918. The meeting was preceded by a complimentary dinner.

The meeting was called to order at eight o'clock, by Dr. William A. Jaquette, the president-elect. The president-elect and the following officers were installed: Dr. O. G. L. Lewis, vice-president; Dr. Arthur E. Bassett, treasurer, and Dr. W. Stirling Hewitt, secretary.

The minutes of the last meeting were read by the secretary and approved. The report of the Treasurer was then read, and on motion received. Drs. Casto and Curry were appointed as auditors. Dr. Frank Fox was elected as the new member of Council.

The report of the Committee on Component Societies of Philadelphia was read by Dr. HEWITT. The matter was referred to Council for action.

The first item on the literary program of the evening was an extemporaneous talk by Dr. O. G. L. LEWIS, on "Unusual Conditions Met With in Everyday Practice."

The President next introduced Dr. R. E. DENNEY, who read a paper entitled "Report of a Case of Follicular Dental Cyst."

[This paper is printed in full at page 319 of the present issue of the COSMOS.]

The next item on the program was a paper by Dr. M. J. WAAS, Camden, N. J., entitled "Indirect-Direct Gold Inlay Method."

[This paper is printed in full at page 328 of the present issue of the COSMOS.]

Dr. J. CLARENCE SALVAS presented a paper on "Care of the Mouth During Pregnancy."

[This paper is printed in full at page 314 of the present issue of the COSMOS.]

DISCUSSION.

Dr. Geo. C. Küsel. I was much interested in Dr. Lewis's talk regarding anomalies. I have also to report a case of a third molar with four roots. I do not know whether this is very uncommon or not, but I never before came across a case or read of one in the literature.

Dr Salvas's paper was particularly interesting to me, because of my having practiced medicine previous to practicing dentistry. I listened closely to his paper to note if there were any distinguishing characteristic or any particular pathognomonic sign in the mouth during pregnancy that had escaped my observation in my years of experience. I was never able to discover such in my practice of medicine, and have not been able to do so in

the practice of dentistry. It seems to me that we meet the same conditions in pregnant women that we do in individuals who are not susceptible to that condition or in women who are not pregnant; so it appears to me that the same treatment that is accorded mouth conditions at other times should be given to them during pregnancy.

Another opinion with reference to the nausea and vomiting in pregnancy, which is rather a late view, is that they are entirely due to what we call anaphylaxis. It seems that there are certain diseases of the placenta, which have not before been closely studied. The placenta comes away and is thrown off; it is studied only by those particularly interested in pathology. The average practitioner disposes of the placenta as soon as he can. Later observers seem to feel that there is some condition of the placenta that causes this condition of nausea and vomiting in women.

As to the influence of dental operations on pregnant women, it seems that when we realize that many women are more susceptible at that time to other conditions than they would otherwise be, we need not be surprised at their being more affected by dental operations then than at other times. A patient once told me that when she was in that condition and did not want to have a child, she used to ride up and down Broad Street on the omnibus—in the days when the street was paved with cobblestones—and that this always had the desired effect! If such a thing as that would bring about such a result, we can understand how a prolonged dental operation might have a similar effect; but usually we can meet our patients and assure them that they will go through the period all right with the attention we give them.

Dr. H. B. Matteossian. There are several points that the paper of Dr. Salvas, however brief, seems to settle. One is the question as to whether dental treatment of any extent should be performed on women in a condition of pregnancy, and the essayist seems to be of the opinion, borne out by the majority of serious practitioners, that such work, when carefully performed, is not only possible but desirable.

The next point Dr. Salvas clears up is the question whether defects found in the mouths of pregnant women are of systemic origin or local conditions produced by hyperacidity and vomiting. The position he has taken is supported by those who have studied the question in recent years, the majority of whom believe that local conditions caused by acidity and vomiting and by changes in the secretions are causes of dental caries and of other abnormal phenomena in the mouths of pregnant women.

The use of trichloracetic acid is very desirable. This remedy is not used to the full degree of its merits. It is not only mildly caustic, but has a stimulating effect; and the granulations produced by it are of a more healthy nature than are those produced by any other caustic in the mouth. It can be used to remove overhanging gum over the third molars, and in certain types of pyorrhea, with satisfaction, and the use of it as indicated by Dr. Salvas in cases of hypertrophy of the gums and bleeding in pregnancy will no doubt produce excellent results.

Dr. Küsel. May I supplement my remarks by stating that I have found that the use of paraffin that melts between 45° and 50°, or at 52°, which is the only kind procurable at the present time, is an excellent thing to massage the gums with. By its use we can get at places we are not able to reach by ordinary massage. I know of no material that is better adapted to the use of patients for this purpose than paraffin.

Dr. J. V. Mershon. I should like to call attention to a statement made in Dr. Denney's paper, that is, the one referring to the extraction of all infected roots of deciduous teeth. I see many suppurating conditions about deciduous teeth, and the opinion is prevalent in the profession that it is necessary to retain these teeth at all hazards, in order to maintain the space necessary for the eruption of the second teeth. I think that we have a duty to perform to these children that is greater than maintaining that space. In

the cases of the greater number of the children that come to my notice this fact has been brought home to me. I have seen a great many children taken with some form of illness; and immediately following that, an abscess forms on a deciduous tooth. Whether there is any connection between these two conditions or not, I do not know; but with the light that we have today on septic infection, it is fair to assume that there is.

I think that we have overestimated the value of retaining these deciduous teeth up to the full time at which the second teeth should take their place. The crowns of these second teeth are formed and well down long before it is time for the baby teeth to be lost; and with the premature loss of a baby tooth, the second tooth very rapidly springs up—at least, sufficiently to maintain that space. About the only exception I can make to that is the premature loss of the baby cuspid teeth, especially the lower, but the lower baby cuspids are rarely found abscessed. So it is my practice to advise immediately the removal of all deciduous teeth that have not vital pulps. I think that probably the orthodontists have gone a long way toward establishing an undesirable proceeding in the dental profession in impressing on the dentists the necessity for retaining these teeth. While their general thought is correct, I believe there is a time when it is safe to lose the deciduous tooth, and when its loss will not interfere with the succeeding tooth. I think that is a matter that should be studied carefully by the men in dental practice who are handling children.

The meeting adjourned at 9.35 P.M.

Northeastern Dental Association.

Twenty-third Annual Convention, at Worcester, Mass., September 26, 27, and 28, 1917.

(Continued from page 250.)

FRIDAY—*Morning Session.*

(Continued.)

Dr. FREDERICK L. STANTON of New York City, presented a paper entitled "Engineering Principles applied to Dentistry," as follows:

Engineering Principles Applied to Dentistry.

By FREDERICK LESTER STANTON, D.D.S., New York, N. Y.

"The methods of diagnosis and operation common to the practice of orthodontia are unscientific and incomplete.

"The object of the practice of orthodontia is to establish normal occlusion in mouths which exhibit malocclusion. Obviously the order of procedure in the intelligent practice of orthodontia should be as follows:

"A knowledge in each case of malocclusion of the form and dimensions of the occlusal arch which the teeth would exhibit when placed in normal occlusion. A demonstration of the malpositions contrasted with the correct positions. A plan to show the distance and direction of movement necessary to each tooth to establish occlusion. A knowledge of the forms, points of attachment, and action of the appliances which will best achieve the desired end. Some definite method of measuring progress and determining when the work is completed.

"The methods in general use in the practice of this specialty fail to meet every one of these requirements. They do not determine in advance the forms of arches which will effect correct relations of the teeth to each other in the same arch and of one arch to the other. Not one orthodontist in a hundred, if given models of upper and lower jaws showing malocclusion, can tell accurately, in advance, what forms of arches he will have to establish in that case to effect normal occlusion. He is compelled to go on the theory that if the arches are big enough to afford room for all the teeth, and the teeth appear to occlude in proper mesio-distal relations, normal occlusion will result and will be permanent. But, as will be shown, arches may easily be large in the wrong directions and deficient in essential directions, and nature will speedily undo his work and restore malocclusion.

"Not knowing what form of arch is necessary to restore normal occlusion, the dentist is unable to determine the distance or direction of movement necessary for the teeth, and is quite as likely to move them wrong distances or in wrong directions as in the right ones. The history of orthodontic cases contains many stories of wrong tooth movements.

"Under present conditions, the orthodontist is unable to select. to the best advantage, the teeth whose movements by him will induce the most advantageous results in other teeth, or the desired line of each movement, or even the point of attachment of the appliances which will effect the results with the least time and with the least effort and pain.

"The orthodontist is at present unable to determine his progress toward establishing normal occlusion. He can only tell such occlusion when the teeth have been fitted to place and he sees it accomplished. As they are only too often never fitted to place, he continues his efforts sometimes for years, not knowing exactly where he stands in the line of progress, but hoping that success may sometime happen. Sometimes it does; frequently it does not.

"These unfortunate conditions obtain because the formulæ which guide orthodontists are not laws verified by exact observation and correct thinking and arranged into a rational system; they are mere observations, precepts, and rules."

I shall attempt to show you from the evidence that orthodontia is taught and practiced in violation of the simplest laws of mechanics.

The evidence is a *résumé* of my research work in conjunction with engineers. Dissatisfied with orthodontic results in general, and with the methods employed by our leading teachers in imparting knowledge, I decided to approach the problem by first equipping myself with a better understanding of collateral sciences. To this end a course of study was undertaken at Columbia College, biological department, on the subject of "The Cell," followed by a course on "Heredity." Contact with the teachers at Columbia changed my dental outlook on the subjects taught, and also suggested a new method of approaching the problem of malocclusion, namely, to borrow from engineering the practice of laying out on paper what you propose to do before trying to do it.

I now proceed to illustrate [exhibiting several slides]—(1) My methods of making dental maps by means of bisecting lines. (2) The dental surveying apparatus. (3) Dental maps in three dimensions. (4) Effects of the "overbite" and "compensating curve" on occlusion. I would also refer to a paper presented at the Panama-Pacific Dental Congress and published in the proceedings, entitled "An instrument for Mapping the Denture," by Frederick Lester Stanton and Rudolph Hanau, M.E.

By means of bisecting lines skulls at Washington were surveyed and data collected in regard to the form and dimensions of the normal arch in races with widely differing arches and skull formations. This yielded results. When the data were examined it was found that in normal skulls there was a small variation of the width of the arch relative to the variation in its length. A line was drawn across the arch at the buccal groove of the first molar. The width of

the arch was measured on this line from a point in line with the summit of the buccal cusps. The height of the dental arch was measured from this width line by a perpendicular to the central incisors. The variation in the width of a dental arch is only 18 per cent. The narrowest arch was 52 mm., and the widest 62 mm.; variation in height, 50 per cent. Shortest arch, 21 mm., longest 34 mm. Or, expressing it differently, in the placement of an upper first molar we have a range of only 5 mm., but in choosing the position of incisors (centrals) the range of variation is 13 mm.

The next step was, by engineering methods, to predetermine the form and dimensions of the arch for any given set of teeth.

These slides [exhibiting] illustrate—(1) A drawing-board method of trial devised by Mr. Hanau—a method which consists of selecting various curves and laying off the mesio-distal diameters of the teeth until a curve is found that would permit of occlusion (as described in full in the Panama-Pacific Congress paper referred to). (2) A method of determining occlusion by means of an engineering instrument, the "Occlusograph," designed by Gilbert D. Fish, C.E. (as described and illustrated in a paper entitled "Technology in Orthodontia," by G. D. Fish, *Internat. Journ. of Orthodontia,* June 1917).

By the use of these maps it is possible to select an appliance to accomplish the desired movements of teeth in accordance with the principles governing analytical mechanics.

These slides [exhibiting] illustrate "models of malocclusion," with maps of the models; predetermined occlusion, appliances used to move the teeth, models, and maps showing results of treatment. (This phase of the work was illustrated in a series of papers published in the *Dental Digest,* February to September 1917, entitled "Science *vs.* Empiricism," by F. L. Stanton.)

Angle, and the teachers who follow his text, attempt to describe the positions of teeth by referring them to the line of occlusion, ignoring the true scientific method of locating bodies in space. "The position of a tooth in occlusion or malocclusion may be accurately stated by giving its relation to the three axes or planes assumed."* The classification of malocclusion by Angle rests on an assumption that is untrue, hence it is a dangerous teaching formula, often leading to a wrong diagnosis and a faulty plan of treatment. Postgraduate and undergraduate schools are still using and teaching the use of the "Hawley arch." This plan should be abandoned, as it rests on the false assumption of the Bonwill triangle, making all dental arches of the same form.

In the September 1916 Dental Cosmos, Angle describes a new form of orthodontic appliance. In the case illustrated there is a wrong principle of treatment; the indicated attachments should not be made to the front teeth at the beginning of the treatment. The dental arch, like any other arch, must be built from its base first. As the bicuspids are the teeth most at fault, these must (with the molars) first be placed before any attempt is made to adjust the front teeth. In a paper published in the September 1917 Dental Cosmos, G. D. Fish, C.E., states: "Mechanical simplicity and definiteness are not to be found in such a device as the Angle ribbon arch. Ask any engineer to analyze the forces exerted upon the teeth by such an appliance, and he will tell you that the factors are too uncertain."

Engineering principles must be investigated by our teachers, and preparation made in our dental schools to inform the students on this subject. New appliances in orthodontia and dentistry should be submitted to technical men before being used in the human mouth.

28 W. Thirty-ninth st.

DISCUSSION.

Dr. F. A. Delabarre, Boston, Mass. I have studied Dr. Stanton's progress in the development of this application of engineering principles to orthodontia for

* "An Instrument for Mapping the Denture," *Proc. Panama-Pacific Dental Congress.*

a long time. I have spent serious thought and a great deal of time on the proposition. I feel that I cannot pay a sufficient tribute to him in commendation of his effort along this line of thought—an effort that, it seems to me, is bound to bring a most definite and positive result in orthodontia.

You who have approached this subject for the first time, who have seen the clinical demonstration, watched these charts on the screen and listened to their explanation, unless you are particularly acute mentally, must be more or less confused. I confess that I am. I am not technically educated along engineering lines, but I think if we put aside for the moment all thought of the intricacies of this thing, and ask the fundamental question, "Is engineering applicable to this particular problem?" our answer must be, "Yes." The value of the results we get must depend upon the proper working out of these principles. Dr. Stanton has the idea and ideals and the "vision" of the genius to approach a proposition of this kind and devote to it all the energy with which he is endowed, and I think all of us who are not similarly endowed should stand behind him and give him what encouragement we can. He has made the assertion that orthodontia of the past and of the present is absolutely without any scientific foundation, and I believe this is true. When it has succeeded in the past it has been a matter of chance, very largely. I do not want to flatter Dr. Stanton by saying that he has attained to ultimate perfection, because I do not think that he has. He is, however, on the high-road to it. There are many things I want to see. I want to see normal occlusion adequately and scientifically defined, and defined to the extent that will allow us to analyze any case of malocclusion and say positively and scientifically, without the fear of dispute, that it is a malocclusion of such-and-such a degree, or to take a case and say that it is absolutely a case of normal occlusion. The orthodontist has not been able to do this. He has only been able to give you his opinion. The more intensive study and the longer time that our specialists in orthodontia give to this field only serve to develop our ignorance along this line.

Speaking to you as dentists, and not as orthodontists, I want to say that I should like you to get this one practical point that has been driven home to me most conclusively this morning—something that I have believed in for a long time, but which the profession has not yet adopted in its dealings with patients—that is, if you are going to deal with a malocclusion, you must do it early in life, before the malocclusion has developed into any of those complicated forms shown this morning. The moment you see, at the age of five or six years, a child whose teeth and jaws have started toward malocclusion, even if you can detect only the slightest tendency, that is the time when corrective measures should be instituted. From my contact with the profession I know that its members have not yet accepted the essential truth of the necessity for the correction of malocclusion by early treatment. It is the only logical method of procedure. If you find that a builder is not following the plans of the architect, do you wait until the building is finished before you tell him to stop, and do the work right? No; you stop him immediately. Now, nature, in building the individual, is not developing the child correctly according to the plans and specifications, due to some internal or external force, and the reasonable thing to do to stop that variation, that maldevelopment, is to step in and aid nature to develop the parts normally.

The whole question cannot be considered merely from a mechanical standpoint. Dr. Wheeler told us this morning that our profession is deficient in the application of knowledge to the problems of dentistry dealing with living tissues. This is also true of orthodontia. It is not purely a mechanical, but a biological question as well. The forces of life, the forces that go to the building up of tissue, are all involved, and the orthodontist who is a mechanical man alone is not fulfilling his whole duty.

I want to congratulate the profession on having a man in it who can attack a question of this kind and bring it to the point where he can handle the mechanical aspects of the problem in such a manner as Dr. Stanton has. Our profession is growing very rapidly, and I am glad that the specialty of orthodontia is not lagging behind. I feel sure that the further development of this idea that Dr. Stanton has brought out is going to mean the solution of the orthodontic problem.

Dr. Ira B. Stilson, Providence, R. I. An instrument has been presented to us that is so highly scientific, so accurate in its construction and in its operation, that it commands the admiration of everyone who sees it. We often make the remark that we cannot achieve perfection, but there can be no harm in attempting perfection, and coming as near as possible to it. Dr. Stanton has shown us here what we might call a perfect method for predetermining the shapes of the dental arches that come into our hands for correction. Those of us who have studied with and under Dr. Stanton have noted in amazement, during the last few years, his progress, as he has successively presented the different steps in the development of this advanced theory of the treatment of malocclusion. I feel that I am inadequate to discuss the paper for the reason that I have not sufficient mechanical ingenuity to comprehend Dr. Stanton's mechanism, and I believe I am not alone, because, as we have talked the matter over among ourselves at our meetings, many of us have felt that the mechanics of the thing was beyond our grasp. That, however, certainly does not condemn it.

There is much besides mechanics, however, to be taken into consideration in the treatment of orthodontic cases. We have all treated cases of malocclusion by guesswork or otherwise. We have sometimes succeeded in establishing what, to our minds, was a pretty fair degree of occlusion. We have made models of some of our finished cases, perhaps in nearly as good position as Dr. Stanton's in some instances, and have shown them with considerable pride. At the end of two or three years, however, to our chagrin, we did not have normal occlusion as we had it in the case when first finished. Something else than malocclusion had been active there—for that we had corrected. We have had cases, on the other hand, in which we were not able to establish normal occlusion quite to our satisfaction. Perhaps we did not reach the exact arch form that we should have reached, but a year or so later, to our gratification, we found that the case had improved after leaving our hands, showing evidence of the forces of occlusion. We know that these forces are present and we endeavor to work in harmony with them, but these forces work differently in different cases. Sometimes the particular forces of occlusion that we are trying to enlist do not seem to act in the way that they should. They operate not simply as forces of occlusion *per se,* but they operate to some remote point—perhaps at the apices of the roots, or in the bony structure above or below the apices. For some reason, a given force will operate one way in one case, and another way in another case.

These are the problems that seem to give the orthodontist the greatest difficulty, and they are problems in which I cannot see that the mechanical phase of the question is going to be a help to us. I do not say that it will be a hindrance, however. There can be no harm in predetermining the form which the arch should take, but it is not always the one in which it will remain, I believe. I think one of the reasons why we have difficulty in maintaining occlusions for the subsequent two or three years as we have them when the work is finished is to be found in a lack of development during the growing period of the child. The forces have become, as we may say, habituated to an action that they acquire during the stage of malocclusion, and we are not able to change these forces—these habits of action. I believe, therefore, that we can seldom get a perfect function of all the forces of occlusion in cases in which the malocclusion has been extensive, and has been continued until almost the full

growth of the child. For that reason I wish, with Dr. Stanton and Dr. Delabarre, to make a plea to you men who are doing orthodontia, for the early treatment of cases of malocclusion. If there is malocclusion at four or five years, there is no reason why treatment should not be begun then. Dr. Delabarre said if the spaces do not begin to form before the age of six, he would start treatment. They begin normally long before six. The child's arch is formed at the age of two and a half years, and often children come to us at the age of six with an arch no larger than it was at the age of two and a half years. The child is larger, but the arches are not. There has been an entire arrest in the development of the bone in which the teeth are enveloped, the foundation on which the teeth must rest. I put in expansion arches at the age of four years, if I see no spaces beginning to form between the incisor teeth. I shall certainly do this in the case of my own children, if I find that at the age of four years nature has not begun to form the spaces that it should.

I have the greatest respect for the work of Dr. Stanton, as all must have, even those of us who are not able to comprehend the beauty and efficiency of his mechanics. There is one phase of the treatment, however, as shown by Dr. Stanton, that almost appals me. If I should secure such extensive movement in so short a time as he has indicated, I would be alarmed. In the last few years I believe that the trend of orthodontic treatment has been toward a slower tooth movement, so that we may have what is termed physiologic tooth movement, a full, well-formed bony bed for the teeth to rest on in all stages of their movement.

Dr. C. Frank Bliven, Worcester, Mass. If Dr. Stanton's presence has been of any value to our association and to humanity, I am certainly very thankful.

If his demonstration of yesterday and his remarks of today are of no value, I am the guilty one, as I am responsible for his presence. I persuaded him to come because of my absolute belief that he has discovered the real fundamental principle of correcting abnormal occlusions.

These abnormal conditions are the result of insufficient nutrition, prenatal and present; not only this undeveloped arch, but the entire system depends on the law of nutrition. How often do we see a physically perfect man? I do not believe Dr. Wheeler has found many among those he is called upon to examine. The nutritional system is much the same as the water supply of a city. If, from any cause, the reservoir or the feed pipe from the reservoir becomes obstructed, that part of the community to which that pipe leads cannot receive its supply of water. So in the human system, if there is lack of nutrition owing to prenatal and present conditions, the supply is inadequate to produce normal growth.

Working with Mr. Perdy, the inventor of the shredded wheat biscuit, a number of years ago, it was my pleasure to examine the mouths of many nationalities throughout the city. There were few who had perfect arches or teeth. Among the children examined I found only one in whom the teeth were in perfect occlusion. In one Syrian family examined, the mother had lost two teeth and had at that time six cavities. In all of these cavities the decay was arrested. The breaking-down process had ceased in her mouth. She had two sisters and a cousin whose ages ranged from twenty to twenty-three, and all these girls had perfect teeth, with no cavities. I asked what care they gave their teeth. The only one who spoke English fluently said they did not use toothbrushes, as it injured the gums. They used only a flannel cloth on their teeth.

In another Syrian family there were four grown girls and a mother. In every mouth I found perfect teeth; no cavities and no evidence of any attempt at cleanliness other than that which nature provides. I tried to analyze the physical and mental differences between these Syrian families and those of other nationalities in relation to the teeth, and it resolved itself into the question of nutri-

tion and the mental conditions which arrest or accelerate nutrition.

It seems to me that one of the great advantages of Dr. Stanton's system is the wonderful assistance it will be to dentists in small communities, thus benefiting the future race of the communities. A dentist in a town of five, six, or seven thousand inhabitants has no opportunity to give orthodontic treatment to any except the few wealthy persons in that community; the rest must go without.

Dr. Stanton has discovered a method which will enable any intelligent dentist in a small town to take orthodontic cases and carry them to a successful termination. These results have only rarely been accomplished among the leading orthodontists. I have had my own troubles, and I believe in the future Dr. Stanton will correct them for me. The younger men will become students of Dr. Stanton's work, and this will introduce it into all communities, thereby benefiting the entire dental profession and eliminating the failures of the past.

After the teeth have been placed in normal occlusion by Dr. Stanton's method, will they retain their position, without attention to the systemic nutrition? This is an important consideration, for should the teeth return to their former position after having been placed in normal occlusion by the essayist's scientific method, orthodontic interference had better be dispensed with, and scientifically constructed artificial substitutes supplied where sufficient masticating surfaces are lacking.

It is my belief that, even with insufficient nutrition, Dr. Stanton's system will make it possible to vastly improve the coming generation, and simplify orthodontic work for the dental profession.

Dr. Stanton (closing the discussion). I have never been more embarrassed in my life. This is the first time that I have read a paper on dental engineering that did not provoke a controversy. The next time I read a paper I am going to ask the president of the society to bar the word biology from the discussion. I bring before you a definite proposition, saying that dentistry is founded on biology and mechanics. Let us dismiss biology, as I did not come to discuss it. Dentists are not trained in mechanics. Dental teachers are not able to solve the simplest problem in analytical mechanics. The simplest problems in the mechanics of the dental arch are not understood. Mechanics, as taught in the technical schools, should be taught in our dental schools.

Dr. Stilson pays me a few compliments, and then slides off into biology. My paper today has nothing to do with biology. If you want to establish normal occlusion, I can plot occlusion on the drawing board, as an engineer handles his problems. By making maps of the malocclusion and occlusion the relative movement of all teeth can be determined. This process is a kinematic problem, with which the biologic problem should not be confounded. Good mechanics cannot be properly applied to straightening teeth without due regard for and knowledge of biology.

If arch determination is a kinematic problem and if appliance designing is a dynamic problem, it behooves us as a profession to inform ourselves in this branch of science—mechanics. Mechanics should be taught in every dental school. Not only orthodontia, but all branches of dentistry would be benefited by a more extended familiarity with the science of mechanics.

Dr. Stilson. If Dr. Stanton wishes to have a discussion on mechanics, he should read his paper before a society of engineers. We must speak from the knowledge we possess.

Dr. N. B. Nesbett, Boston, Mass. As a guest of this society and a man known as a mechanical dentist, and one exceedingly proud of the title, I want to say that Dr. Stanton is the first man that I have heard get up and attack the problem from a scientific point of view. He has approached the subject in the proper way, by going to engineers for the data he wished to get for his results. If we are not mechanical men, we should not undertake any problems of either orthodontia or prosthetic work. I want to

thank Dr. Stanton again for coming before us as mechanical men.

The President appointed the following as members of the committee to formulate plans for carrying out the recommendations in the President's Address, as approved by the Committee on President's Address in their report: Dr. W. R. Pond, Rutland, Vt.; Dr. Charles McManus, Hartford, Conn.; Dr. Thomas J. Barrett, Worcester, Mass.; Dr. A. J. Sawyer, Manchester, N. H., and Dr. Wm. S. Greene, Newport, R. I.

The report of the Auditing Committee was then read by Dr. T. J. Barrett.

On motion the report was accepted and placed on file.

Dr. Bush and Dr. Holmes were asked by Dr. Manson to escort Dr. Stilson, the newly-elected president, to the chair. Dr. Manson, with a few appropriate words, turned over the gavel of office to Dr. Stilson, who replied as follows:

Dr. Stilson. I do not overlook the honor that has been conferred upon me by the association, but the emotion which moves me today is not a feeling of honor, but one of responsibility. This is not, and cannot be, a one-man organization, and I plead for the support which my predecessor has asked you to give me. I think that the meeting this year has been the best meeting that this society has given its members in a number of years. I ask your support and co-operation in order to make the next as good or better. I thank you.

There being no further business before the society, Dr. Stilson declared the meeting adjourned.

THE DENTAL COSMOS

A MONTHLY RECORD OF DENTAL SCIENCE.

Devoted to the Interests of the Profession.

EDWARD C. KIRK, D.D.S., Sc.D., LL.D., *Editor.*
L. PIERCE ANTHONY, D.D.S., *Associate Editor.*

PUBLISHED BY THE S. S. WHITE DENTAL MFG. CO., PHILADELPHIA, PA.

SUBSCRIPTION PRICE, including postage, $1.00 a year to all parts of the United States, Hawaiian Islands, the Philippines, Guam, Porto Rico, Virgin Islands, Cuba, and Mexico. Canada, $1.40. To other foreign countries, $1.75 a year.

Original contributions, society reports, and other correspondence intended for publication should be addressed to the EDITOR, Lock Box 1615, Philadelphia, Pa.

Subscriptions and communications relating to advertisements should be addressed to the BUSINESS MANAGER of the DENTAL COSMOS, Lock Box 1615, Philadelphia, Pa.

PHILADELPHIA, APRIL 1918.

EDITORIAL DEPARTMENT

Pending Navy Dental Legislation.

In our previous issue we printed the text of a bill, S. 3386, introduced by Senator Lodge, the purpose of which is to give to the Navy Dental Surgeons Corps a status corresponding to that accorded to the Army Dental Surgeons Corps by the act of October 6, 1917. We understand that the Navy Department is willing to accept the principle involved—namely, to recognize the equality of professional status of the dental surgeon within his corps with that of the army surgeon within the Medical corps. In connection with the Lodge bill as published in our March issue we appended the following note: "We are informed that the above bill in its present form does not fully meet the requirements of the Navy Department, and that other legislation involving the principle of

equality of status for the Medical and Dental corps is under consideration."

Subsequent to the above writing, *i.e.* on February 5, 1918, Senator Tillman introduced a bill, S. 3749, "To Reorganize the Dental Corps of the Navy, and for Other Purposes."* This bill is understood to embody the views of the Bureau of Navigation of the Navy Department regarding the application of the principle of equality of rank, as to the medical and dental services respectively, in the navy. Both bills are for the present on file with the Senate Committee on Naval Affairs, to which they were referred after having been twice read in the Senate.

There are certain matters underlying this legislative effort that call for serious consideration. Nearly sixty years ago the preliminary steps were taken to secure to those in the defensive service of our nation the benefits of systematic dental and oral treatment. The movement was initiated at a meeting of the Western Dental Society held in Quincy, Ill., when favorable action was taken on a resolution presented by the late Dr. H. J. McKellops of St. Louis, providing for the creation of a committee to take charge of the matter of securing national legislation creating a dental service in connection with the army. As the resolution is of historic importance we here reproduce it from the report in the *Dental News-Letter* for October 1858, page 37:

> Dr. McKellops offered the following preamble and resolution:
>
> *Whereas,* Owing to the great inconvenience of the officers and soldiers in procuring competent dentists, when necessarily required, and knowing the difficulty in which they are placed, being stationed at distant posts where it is absolutely impracticable for a regular practitioner of dentistry to visit them; therefore
>
> Resolved, That this society appoint a committee of five, for the purpose of memorializing Congress on the necessity of dentists to be attached to the regular army, and that we recommend the same to the consideration of the American Dental Convention and ask their co-operation with us.

The committee appointed pursuant to the resolution consisted of Drs. McKellops, Spalding, Forbes, Branch, and Lewis, and the president of the society, Dr. W. W. Allport, who was subsequently added by vote of the society. No tangible result other than the development of a favorable professional attitude of mind toward

* This bill, which was also introduced by Mr. Dyer in the House of Representatives as H. R. 10724, will be found at page 365 of our present issue.

the object in view flowed from the above-quoted resolution until 1900, when the Otey bill providing for the creation of an army dental service on a contract basis became law. It took over forty years to even partially realize in a practical way the purpose defined in the McKellops resolution.

With justifiable dissatisfaction as to the undignified and at the same time impotent position given to the dental surgeon in the army service under the Otey law, strenuous efforts were made to place the corps upon a commissioned basis, culminating in the passage of the Army General Appropriation Bill H. R. 31237 on March 3, 1911, containing the clause which placed the Dental Surgeons Corps upon a commissioned basis, but with rank, pay, and allowances inferior to those accorded the medical corps. On October 6, 1917, this distinction was wiped out by Congressional action, and the dental corps was given legal status equal to that of all other branches of the medical service. As already stated, it has taken nearly sixty years of effort and agitation to reach the goal anticipated by the McKellops resolution.

Three factors, in our opinion, have been prominently active as obstacles to the earlier achievement of the ends now attained. First: Diversity of opinion within the dental profession as to what ought to be achieved in legalizing dental service in the army and navy. Second: Opposition by the medical profession toward any effort to place dentists on an equal status with physicians and surgeons in the national service; and Third: The baleful influence of a minor self-seeking group who in the effort to continually safeguard their own selfish ends have opposed and from time to time have defeated, by creating discord and inharmony of action, legislation conceived and framed for the good of the service and the good of the dental profession.

This element has served to impress the Congress or its committees with the belief that the dental profession did not really know what it wanted—that there was solidarity neither of mind nor of action with regard to national dental legislation; and so the matter dragged its weary and checkered course through more than half a century before a successful result was achieved. No question affecting the status of dentistry is of more fundamental importance than the light in which its activities are viewed by our national Government. The definition of professional status of

the Army Dental Surgeons Corps embodied in the law of October 6, 1917, is an official recognition of the professional position for which its votaries have contended since the birth of dentistry as a profession; but until the same definition and status is accorded by law to the navy dental service the achievement is but half attained, and the vexed question of professional recognition for dentistry will remain an open one.

Congress will undoubtedly do, in principle and in effect, for the navy what it has already done for the army dental service; but its effort in that direction must not be hampered by ignorance, disharmony, or self-serving ambitions upon the part of any who would impress that influence on the framing and promotion of the necessary legislation in behalf of the dental profession. We should have had a commissioned dental corps a half-century ago if the dental profession could have presented a solid front to Congress on this question and the superserviceable and self-seeking meddler had been eliminated. Let us profit by experience. The Tillman bill is a fair statement of the attitude of the Navy Department, and is in general representative of the view of the Navy Dental Surgeons Corps. If it is to be modified in the Senate Committee on Naval Affairs, as doubtless it may be before its final passage, let the required changes be made by those who are looking to the conservation of the higher ideal of increasing the efficiency of the service conformably with the proper dignity of the dental profession and the views of those who are sufficiently familiar with the whole situation to be able to deal with it intelligently and effectively.

Above all, a determined resistance should be made to the activities of the intermeddling self-seeker whose only interest is the promotion of his own selfish objects. In these days of social regeneration when the world war is revealing a new and we believe higher meaning for the life activities of mankind, there should be no place for the individual whose primary consideration is himself. Where selfishness has interposed its influence we have lost, and where an altruistic spirit of service has dominated we have won in this national legislative effort. The record is clear; let us not repeat our mistakes.

Incidental to the proposed navy dental legislation it is pertinent to call attention to the fact that by a decision of the Judge Advocate-general the provisions of the act of October 6th reorgan-

izing the Army Dental Corps are applicable to the Army Dental Reserve Corps as well. Following out the same principle, analogous provision should be made with reference to increases in rank, etc., in the Naval Dental Reserve Corps, and we hope that this point may receive the serious consideration of the several legislative committees who will have the matter in charge. There is no proper reason why effective legislation according a status to the Navy Dental Corps, both regular and Reserve, on a parity with that accorded the corresponding Army Dental Corps, should not be passed at this session of Congress. Now is the accepted time, and the parties in interest should act vigorously as well as intelligently.

"l'Aide Confraternelle" Honor Roll.

In response to our appeal in the January issue we have received the following contributions to "l'Aide Confraternelle":

Reading Dental Society, Reading, Pa.	$25.00
Dr. H. H. Wilson, Phœnix, Ariz.	10.00
Dr. Morris Mestel, New York, N. Y.	5.00
Dr. N. P. MacDermid, Charleston, W. Va.	10.00
Dr. Wm. C. Fisher, New York, N. Y.	10.00
Dr. J. H. Oliver, Philadelphia, Pa.	10.00
Dr. Harry Bear, Richmond, Va.	2.00
Dr. B. B. Detwiler, Herndon, Va.	1.00
Dr. Herbert L. Wheeler, New York, N. Y.	50.00
Dr. Jules J. Sarrazin, New Orleans, La.	5.00
Dr. L. P. Bethel, Columbus, Ohio	10.00
Bureau of Fourth International Dental Congress	82.50
Dr. E. C. Kirk, Philadelphia, Pa.	25.00
	$245.50
Previously received.	
Dr. J. W. Jungman, Cleveland, Ohio	5.00
Total	$250.50

We hope that this modest beginning may presage a more liberal expression of sympathy on the part of the dental profession of America for their destitute and suffering transatlantic colleagues. All amounts received will be promptly forwarded and acknowledged in succeeding issues. Your prompt and liberal contribution is solicited.

Bibliographical

American Illustrated Medical Dictionary. A New and Complete Dictionary of Terms Employed in Medicine, Surgery, Dentistry, Pharmacy, Chemistry, Veterinary Science, Nursing, Biology, and the kindred branches; with new and elaborate Tables. Ninth Edition, revised and enlarged. Edited by W. A. Newman Dorland, M.D. Large octavo of 1179 pages, with 331 illustrations, 119 in colors. Containing over 2000 new terms. Philadelphia and London: W. B. Saunders Company, 1917. Flexible leather, $5.00 net; thumb index, $5.50 net.

The construction of a dictionary calculated to fairly cover the vast field of modern medical terminology is an arduous task whose faithful accomplishment is worthy of grateful acknowledgment on the part of those whose daily queries it is found to solve; and the present-day lexicographer who in successive editions has to live up to an established reputation for "keeping abreast" has no sinecure. New ideas are ever springing up and new words describing them demand recognition. In the present edition of the American Illustrated Medical Dictionary it is understood that about 2000 entries make their bow to its professional *clientèle*.

Of itself, the demand for a ninth edition of a work emanating from the literary travail of Dr. W. A. Dorland and his associates and whose material soma issues from the W. B. Saunders Company is a guarantee of excellence, which is confirmed by the general evidences of advancement in the path along which these sponsors have hitherto brought this important work.

A number of the newer terms have arisen in the course of the professional activities called forth by the present international conflict. Nor could it be otherwise in a faithful record in these stirring days, owing to the many beneficent advances in diagnostic and medicinal means and methods that are ever cropping forth, and the marvelous surgical improvements to which recourse is now available, and when even new pathologic entities are making their appearance—all of which must be given a local habitation and a name in an up-to-date reference book. And we find here, *e.g.*, such entries as ambrine, chlorazene, flavine, trypaflavine, javellization, Laclainché-Vallée serum; such pathological designations as "trench back," "trench foot," "trench fever," etc., and a score, perhaps, of "war abbreviations," as P. U. O., an English designation for the fever just named, the initials representing "Pyrexia of Unknown Origin." In which last phrase, by the way, occurs one of the extremely few typographic slips, giving the word as Pyr*e*ria. On page 863 we find an *a* for the middle vowel in a mention of the city of the famous shrine of the many-breasted image that "fell down from Jupiter," whose claims when challenged the enthusiastic citizens overwhelmingly established by making the amphitheater ring for 120 minutes

by the clepsydra with "Great is Diana of the Ephesians!"

In the war abbreviations there is doubtless a present utilitarian value; in less hasty times, however, on the hoped-for re-establishment of a live-and-let-live international philosophy they may well be allowed to fall into "innocuous desuetude." With the necessarily multiplying abbreviations in the sciences, it would seem that the ministrants of healing need not add to them, but so far as possible abide content with those called for in prescription writing and other established uses. There is much liability to ambiguity, and this may be fraught with danger to life.

Of handsome exterior, with its red leather flexible covers, this "large 8vo" book maintains a high typographical ideal, exhibiting experienced judgment and excellent workmanship. The body type is clear, notwithstanding its necessarily small size; the heavier type of the overhanging entries is harmonious with it, and the Greek derivations are given in an admirable Greek face, neither too bold nor too slim, and well adapted to accompany the English type. Judicious selection is evident in each feature, making the page inviting to the discerning eye; and thin but opaque paper combines with first-class presswork to give a clear impression and uniform "color" from beginning to end.

Speaking now of other general impressions, and first of the illustrations, it is welcome when referring, say, to the anatomic tabulations of arteries, veins, muscles or nerves, to find these pictured in colors on the pages immediately facing their mention. The illustrative material has been subject to considerable additions; there are, in fact, as many as 115 colored illustrations in this edition, and of those in black and white over 300. As to tables, it would seem that about everything suited to tabular presentation is found here, including those of the exanthemata, of signs and symptoms, of serums, tests, reactions, staining and fixing methods; of operations; the various "procedures" known as such are given, the special technique being indicated. The posologic and therapeutic table at the end is a full one, occupying 50 pages. The brief biographies of the men whose names are specially connected with diseases, or methods of treatment, or operations, constitute an invaluable feature.

While for the province of dentistry a special wordbook is called for—and there are parturient symptoms of new dental nomenclature even at this moment—yet the dentist, it goes without saying, almost as much as the physician, must be familiar with innumerable matters that are constituents of this medical dictionary, while the feature of its recognition of dental terms has already, in the eighth edition, been commended in the DENTAL COSMOS. It may, however, be remarked in connection with the word Tooth (the words Tooth and Teeth take up about three-quarters of a page), that, after mention of the "root or fang," the latter word is unfortunately chosen in each of several subsequent mentions of the root. This is a blemish; the dental profession has abolished the "fang." Uncorrected, this is liable to cast an unjust reflection upon the other dental entries.

The DENTAL COSMOS has from time to time commended what is known as the "dictionary habit," and its application to the work before us could not but prove most fruitful of real interest and abundant profit. Whether this book be taken up from time to time with the purpose of recalling partly forgotten knowledge,

and of adding thereto, or to make references when perusing professional literature or contributing to it, or whether, again, in the exigencies of practice recourse may be had to its valuable epitomes of symptoms and methods—for these may be recalled instantly here, even the quite recent ones—the practitioner of healing is furnished with a treasury of information for his own advancement in knowledge, for immediate aid and counsel in emergencies, and for the promotion in various ways of his usefulness to his patients.

REVIEW OF CURRENT DENTAL LITERATURE

[*British Medical Journal*, London, January 12, 1918.]

Solvents for Dichloramine-T. By H. D. Dakin and E. K. Dunham.

Dichloramine-T is readily soluble in most organic solvents, with the exception of the paraffin hydrocarbons. The majority of these solutions are of no value for practical purposes, since the dichloramine-T contained in them is rapidly decomposed. Among the few solvents which give reasonably stable solutions many had to be rejected on account of their proving too irritating, so that it will be realized that the selection of a suitable solvent for dichloramine-T is a somewhat difficult problem.

The authors undertook a systematic survey of other possible solvents with the object of finding a cheaper and blander substitute for eucalyptol (the one hitherto most generally employed). This aim is believed to have been accomplished, at least in part.

It appeared, from extensive experiments, improbable that solvents containing oxygen were likely to prove successful, since they usually abstract chlorin from the dichloramine-T too readily. The choice then practically resolved itself into halogen derivatives of other hydrocarbons of the aromatic, aliphatic, and other series.

The authors turned, after experimental elimination of other possibilities, to the chlorin derivatives of the higher aliphatic hydrocarbons.

It was found that paraffin wax could be readily chlorinated under easily regulated conditions. The product when prepared as described below was an extremely bland, rather viscous oil, which readily dissolves dichloramine-T. The solution so prepared was stable over long periods, if kept under suitable conditions. The authors have provisionally chosen the name of "chlorcosane," for this solvent, since the systematic names of most of the hydrocarbons in paraffin wax end with the suffix "cosane."

Chlorcosane is prepared as follows: Paraffin wax, of a melting-point at 50° C. or higher, is placed in round-bottomed flasks and heated to about 120° C. Two flasks connected in series, each containing half a kilogram of the wax, may be conveniently used. A rapid current of chlorin from a cylinder of liquefied gas is then passed through the molten wax in the flasks, each of which is provided with a thermometer and the necessary glass tubes. The temperature should be controlled within the limits of 125° to 140° C. The first flask, in which the reaction is the more vigorous, will require but little heating. Chlorination is continued until the contents of the flasks have increased in weight 45 to 65 per cent. of the weight of the wax taken. It will be found convenient to complete the chlorination of the first flask and then remove it, and transfer the second to its place, putting a fresh flask of paraffin wax after it. In order to avoid undue discoloration of the product, a minimum amount of rubber tubing should be used

for passing the gases, and the ends of the delivery tubes are preferably blown into bulbs provided with a number of fine orifices to promote good contact between gas and oil. Hydrochloric acid is freely evolved during the reaction. After the requisite amount of chlorin has been absorbed, the oil, while still warm, is shaken vigorously with 5 per cent. of its weight of dry sodium carbonate, and then filtered through a dry fluted paper. The clear oil, which has a light yellow or sherry color, and is slightly heavier than water, is then ready for use. It possesses a viscosity intermediate between that of olive oil and castor oil, has almost no odor, and is perfectly bland when sprayed up the nose or placed on skin or wounds.

The materials necessary for making this new solvent are all easily available at very small cost. It has no appreciable antiseptic action. At room temperature it can dissolve from 8.5 to 10 per cent. dichloramine-T. For wound treatment a 7.5 to 8 per cent. solution is strong enough. After heating the solvent, "chlorcosane," to 75° or 80° C., it will easily dissolve the necessary quantity of dichloramine-T. If necessary, filter, although with pure materials this is not required. The clear solution should be at once stored in small amber corked bottles, and not exposed to unnecessary heat.

Under ordinary conditions solutions which are protected from light by amber bottles and from contact with water or excessive heat may safely be used for two months, or possibly longer. The clinical results of dichloramine-T in this new solvent are similar to those already recorded by Lee, Sweet, and others.

[*New York Medical Journal*, January 12, 1918.]

Oral Sepsis and the Anemias. By M. L. Graves.

Anemia constitutes but one of the numerous clinical manifestations of sepsis or infection, whether it originates in the mouth or elsewhere. The author agrees with the belief of Wm. Hunter that pernicious or infective anemia should be ascribed to mouth infection.

One concrete case under Graves' personal observation illustrates this. Rigid examination failed to reveal any focus of infection save the mouth, which showed a bad glossitis and pyorrheal abscesses about all the few remaining teeth. The administration of 5200 cc. of blood by citrate infusion at intervals, the use of salvarsan intravenously, the administration of HCl, and good food and rest, resulted in an only very temporary improvement. However, the removal of all the infected teeth permitted a rapid and marked improvement. The patient returned to a laborious occupation with the appearance of health and a blood exhibit approximating normal.

[*La Restauration Maxillo-Faciale*, Paris, July and August, 1917.]

Salivary Fistulæ. By L. Dieulafé. (August.)

Two Cases of Fistula from the Parotid Gland, Cured by Resection of the Auriculo-Temporal Nerve. By Deupès. (July.)

The article by Dieulafé is the more comprehensive of the two. The increased incidence of facial wounds in modern warfare increases the frequency of salivary fistulæ. In civil practice and also in war surgery the two varieties which vastly predominate are parenchymatous fistulæ of the parotid and fistulæ of Stenson's duct. For a fistula of the parenchyma of the parotid, at one time or another the following means have been advocated:

(1) Compression and excision of the fistulous tract. These have proved themselves insufficient.

(2) Cauterization, either with silver nitrate or thermo-cautery. This has given some good results. In mild cases Dieulafé always advises to commence treatment with one or the other of these methods. They are particularly adapted to fistulæ sequent to intraglandular suppurations.

(3) Injections of oil into the fistulous tract. In two cases where this was tried by Dieulafé the result was ephemeral.

(4) Creation of an intrabuccal opening by transfixation. The author tried this method in three cases, in one of which it did not succeed.

(5) Resection of the auriculo-temporal nerve. On account of the complexity of the innervation of the parotid gland the author was not too sanguine of an absolute drying-up of the parotid secretion by resection alone

of this nerve. For this operation local anesthesia should be reserved for those cases where there is no inflammation or cicatricial tissues in the region where the nerve is to be sought. The secretion never stops immediately after the operation. Dieulafé practiced this method three times in healthy surroundings and twice in cicatrices. In all five cases the secretion was prolonged after the operation, then it disappeared. In two cases it was necessary, in order to complete a cure, to resort to cauterization, which had previously by itself failed. When everything is taken into consideration this operation leads to the desired therapeutic success.

Deupès has confined his attention in his report exclusively to this method of treatment, namely, resection of the auriculo-temporal nerve. In his experience salivary fistulæ, together with facial paralysis, are very frequent sequelæ to the cicatrization of extensive regional lacerations. His two cases are those of fistulæ from the parotid parenchyma. He summarizes his operative procedures as follows:

(1) Local anesthesia under novocain-adrenalin.

(2) Vertical incision, about 3 cm. long, half above and half below the zygomatic arch.

(3) Search for the nerve. The pulsations of the temporal artery have not served as a landmark. It was necessary to seek under the upper part of the incision for a peripheral filament of the nerve, and to follow this to the trunk.

(4) Dissection of the nerve in the sheath to the lower part of the incision, that is, to the glandular tissue.

(5) Gentle traction on the nerve with a hemostat, so as to obtain as great a length as possible until rupture. This step of the operation was always quite painful.

(6) Reunion of the cutaneous borders with the clasps of Michel.

On the next day, on removing the dressings, there was proof that this operation, benign, without blood, and rapid, had perfectly succeeded.

The remainder of Dieulafé's paper is concerned with the fistulæ of Stenson's duct. Among the war-wounded it is possible to recognize divers pathogenic groups: (1) A very limited traumatic injury to the cheek, by a shell splinter, directly involving Stenson's duct, and creating a fistula as a result of a lateral section of this duct; (2) great lacerations of the cheek by shell splinters, followed by retractile cicatrices encircling the duct, obliterating its normal orifice and leaving open toward the skin the wound, which involved the duct; (3) traumatism, again by shell splinters having involved the bones and soft parts, resulting in inflammatory phenomena which open, abscess, and make a fistula out of Stenson's duct. The second variety is the most frequent; each of the others has been observed by Dieulafé but a single time.

In spite of the frequency of facial lesions among the war-wounded, of their seriousness, and of the vast lacerations which they produce, the author has gained the impression that the fistula of Stenson's duct is a rare complication. The following methods of treatment are mentioned, and some of them are briefly outlined: Compression of the gland or the duct, the injection of substances tending to promote atrophy, absolute immobilization of the jaws, cauterizations of the fistulous tracts (in one case by this method Dieulafé obtained a cure; the wound was completely limited to the buccinator region, and bordered directly upon the canal), simple occlusion of the fistula, suture of the fistula, suture of the two ends of the duct together, re-establishment of the permeability of the anterior (distal) end of the canal, the creation of an artificial passage toward the mouth (this method by transfixation has appeared to the author applicable to the generality of cases, whether they concerned wounds of Stenson's duct or the masserteric lobes of the parotid gland; the author employed this method four times, always with success), the transplantation of Stenson's duct (this procedure is contra-indicated where the tissues are cicatricial, but Dieulafé advocates it for all cases where there can be found an appreciable segment of the posterior, *i.e.* proximal, end of the duct, and where this can be fixed to a healthy mucosa, the author has had one failure, a civilian case, and two successes, military cases, by this method), the creation of an artificial duct at the expense of the mucosa, and finally, the suppression of the parotid secretion. The last method is not recommended personally by Dieulafé. However, to accomplish this the duct may be ligated.

[*Surgery, Gynecology, and Obstetrics,* Chicago, February 1918.]

Remarks on Dichloramine-T. By Edward K. Dunham.

Dichloramine-T is an aromatic chloramine containing a little over 29 per cent. of chlorin. Its systematic name is toluene para-sulfon-dichloramine. It is only slightly soluble in water, but freely soluble in certain oils. This property is of essential importance in its use as an antiseptic.

Dunham prefaces his discussion of this representative of the newer antiseptics with a brief survey of the whole subject of the antiseptic treatment of wounds from the laboratory viewpoint. For successful disinfection, three conditions must be met: (1) Contact of antiseptic with infecting organisms; (2) time during which this contact is maintained, and (3) adequate mass, or concentration of the antiseptic at the points of contact. But little dependence can be placed upon the power of penetration of any known antiseptic, least of all when these are chemically unstable in the presence of substances occurring in wounds.

There are three things of prime importance that should be known about an antiseptic before it is chosen as appropriate for a given purpose, because the way in which it should be used to obtain the best results depends on such knowledge as—(1) The speed or rate of disinfection, (2) the stability of the substance under the conditions of its use, since this affects the duration of disinfection, and (3) the permissible concentration, for this determines the mass of antiseptic that can advantageously be employed.

The speed of disinfection is enormously influenced by the medium in which the antiseptic acts. In a medium of equal parts of blood serum and muscle extract, the disinfectant action of the members of the chlorin group were extremely rapid.

All the members of this group have a direct chlorinating and an indirect oxidizing power. The germicidal action of chlorin antiseptics is not specific, but is incidental to the high reactivity of this group of compounds. In other words, the efficiency of this group is a function of their chemical instability and high affinity for many other substances, and consequently to secure the best results provision must be made for an adequately frequent renewal of the antiseptic. The chlorin antiseptics have a very striking detoxicating effect upon wounds, in addition to germicidal and deodorant action.

The third factor, the permissible concentration in which these antiseptics can be applied, and therefore the mass entering into the above reactions, can only be determined by clinical experience. Solutions of dichloramine-T in oil can be used in concentration up to 20 per cent. if need be, thus introducing an extraordinary mass of antiseptic at a single application. This abundant and apparently excessive mass can become effective without undue irritation. When proteins are present—and they invariably are in the secretions of wounds—the amount of active chlorin transferred from the oil solution is amply sufficient for rapid action. This action is continuous, not intermittent, and the renewal of the antiseptic coming into play in the secretions is automatic, and persists until the store in the oil has been exhausted.

[*American Journal of the Medical Sciences,* Philadelphia, February 1918.]

The Incidence of Chronic Focal Infection in Chronic Diseases. By Lovell Langstroth.

This report is a brief summary of the data, pertinent to the doctrine of focal infection, afforded by the medical clinic of the University of California Hospital. The subject was of interest not only because it explained the cause of diseases whose etiology was hitherto unexplained, but also because it opened up a hopeful field in respect to therapeutics.

Langstroth summarizes his observations as follows: 84 per cent. of ulcer (gastric and duodenal) patients, 66 per cent. of acute or subacute cases of arthritis, 73 per cent. of the chronic cases of arthritis, and 100 per cent. of the gall-bladder cases, have been associated with chronic focal infections.

These figures are imposing until we realize that they are percentages based upon a totality of thirty cases of gastric and duodenal ulcer, of twelve cases of acute or subacute arthritis, of forty cases of chronic arthritis, and of four cases of chronic gall-bladder disease.

In the face of this it must be granted

that—"The figures do not, of course, prove any causal relation between chronic focal infection and the various chronic diseases mentioned." It is just this proof which is the crux of the whole question.

What is of special interest to the dentist in this paper follows: "In a number of cases the therapeutic results have been good; in a few cases they have been brilliant. The foci which lend themselves most readily to our work are the teeth and the prostate. On two occasions we have insisted on the removal of teeth because the [roentgen] plate showed a distinct area of rarefaction at the root-apex, and pus has not been found. *Even with a positive report from the roentgen-ray department, one should rely on the judgment of a competent dental surgeon when he declares the tooth to be, nevertheless, sound.*"

The following is probably one of the brilliant results referred to above: One of the patients was a girl of seventeen years, with a subacute arthritis of the right foot of several months' duration. The joint improved the day after drainage of an alveolar abscess by extraction, and in ten days the patient wore a shoe for the first time in three months. An intensive and complete study of a concrete case such as this would be far more opportune and welcome than the elaborate compilation of statistics.

[*Science*, November 9, 1917.]

Anesthesia and Respiration. By A. R. C. Haas.

It seems necessary to establish with certainty the effect of anesthetics upon respiration before a satisfactory theory of anesthesia can be formulated. Haas has measured the change in the hydrogen-ion concentration of sea-water produced by the respiration of the marine alga, Laminaria.

Experiments were carried on with sea-water containing the following substances: Chloral hydrate, novocain, ether, caffein, ethyl bromid, formaldehyd, chloroform, acetone, and ethyl alcohol.

"It was found that whenever the concentration of anesthetic is sufficiently strong to produce any measurable result, the initial effect is always an increase of respiration, which may either remain approximately constant over a large number of periods and then gradually decline, or the increased rate of respiration may fall very rapidly below the normal when the concentrations of anesthetic are too great. No decrease is observed with low concentrations which are not toxic. These facts contradict the theory of Verworn that anesthesia is a kind of asphyxia, for his view is based on the assumption that anesthetics decrease respiration."

PERISCOPE

Vincent's Angina.—Dr. Thomas Hubbard of Toledo states that reports of fatalities, in a disease that was usually transient and curable, indicate that a large number of cases are not diagnosed. Laboratory study of all ulcers and false membranes is necessary to positive, timely diagnosis. Perborate of sodium is an efficacious local medicament. The nascent hydrogen dioxid penetrates and disintegrates necrotic tissue, and is, theoretically, an ideal inhibitor of anaerobic bacterial growth. The local treatment resolves itself into careful applications limited to the diseased tissue. The glycerol of iodin—iodid of zinc 2, iodin 3, aqua destillata 5, glycerin 10—applied to the tonsil crypts was probably the most efficacious antiseptic. Theoretically the arsenical group is specific in action, and the writer believes that experience is proving favorable. He reports a case which presented a hopeless condition prior to the administration of neosalvarsan, and the improvement following was comparable only to that in diphtheria cases following a proper dose of antitoxin. In cases that did not yield promptly to this treatment cacodylate of sodium should be given, 2.5 to 5 grains, repeated in twenty-four or forty-eight hours, if the kidneys are not affected. In the malignant type, not improving under the above treatments, neosalvarsan 0.6 gram is given intravenously.—*N. Y. Med. Journal.*

A Hint on Mixing Cement.—For the proper mixing of cement a strong, pliable, rather long-bladed spatula gives the best results. It should be used rapidly with long, strong strokes, exerting considerable downward pressure, thus compelling a thorough mechanical mixing, which is the only way to create the opportunity for an accurate chemical union, which is very necessary if the maximum density and adhesiveness is to be attained.—*Oral Health.*

Removing Blood Stains.—To remove blood stains use a concentrated solution of chloral hydrate, from 70 to 80 per cent. Not only recent blood stains on linen, but stains existing for from ten to twenty years, first moistened with a drop of acetic acid and then soaked for some hours in a chloral solution are said to be perfectly removed. Blood stains on white materials may also be removed by treatment with hydrogen dioxid solution. It may take some hours to act if the stain is old.—*Druggists' Journal.*

Annealing Lingual Bars.—In the construction of lingual bar cases for partial lower dentures where the bar is to be soldered to gold saddles, the bar should be thoroughly annealed after bending and final adjustment has been completed, otherwise the heating in soldering will cause the bar to spring, and the case will not go back to place properly on the cast, and failure will result in the mouth. This result will also obtain in vulcanite cases unless the bar is annealed before final adjustment.—Victor H. Fuqua, *Dental Review.*

Local Anesthesia for Painless Operating.—Because of the initial pain accompanying the insertion of the needle, because of toxic symptoms observed, because of after-pain and soreness, and because of occasional sloughing of tissue and even abscess formation occurring at the site of injection, many otherwise conscientious operators have shunned the hypodermic syringe and the local anesthetic solution, thereby inflicting untold agonies that might have been avoided had they mastered the technique of our modern methods of induction. Every dentist can do better and more thorough work if he can operate painlessly, and incidentally, patients may use up their nervous energy in much more useful pursuits than that of enduring unnecessary pain incident to the excavation of sensitive cavities, the extirpation of vital pulps, or the extraction of teeth.—P. G. Puterbaugh, *Dental Review.*

Iodin as an Antiseptic.—Iodin is one of the most widely used and most useful of antiseptics. It was introduced as a skin disinfectant by Stretton in 1909, and for this purpose is undoubtedly of great value. It has been found much too irritating for repeated application to open wounds, and it is said that severe neuritis has been observed as a result of its use. Its strong coagulating action upon protein is also an objectionable feature. "In general, it may be said that iodin will be found most useful when the conditions are such that rapid and complete sterilization may be effected by a single application, as in skin disinfection or small surface wounds."—*Amer. Journ. of Clin. Medicine.*

Bleaching Teeth.—One of the very best bleaching agents for discolored teeth is 25 per cent. pyrozone. The root should be filled, and a pellet of cotton saturated with the pyrozone should be placed in the cavity and sealed with cement. It may be left two or three days, and if a tooth can be bleached at all, it will be bleached by this method. The pyrozone comes in sealed glass tubes. Care must be exercised in opening the tube. It should be chilled on ice and wrapped with a towel, letting the narrow end of the tube extend from the towel. This can then be snipped off with pliers, and the contents of the tube poured into a clean glass-stoppered bottle. A second application of the pyrozone may be necessary in deeply discolored teeth. —Editorial, *Dental Review.*

An Interesting Case of Hypertrophied Tissue.—Miss X., about forty years of age, came to my office with the roof of her mouth covered with hypertrophied tissue in the form of soft teats as big as the end of the little finger. My diagnosis was that the plate was ill-fitting and did not go up into the arch in front, but did in the back, thus forming a vacuum. As "Nature abhors a vacuum," the tissues had grown down trying to fill it up. I cocainized and removed all the large teats possible, cauterized the remaining tissue with 4 per cent. $AgNO_3$, and applied glycerite of tannin. I then built up the plate with modeling compound until it caused an even pressure on the affected area, thus causing absorption. I saw the patient every few days, and cauterized and built on to the plate until I got her mouth into absolutely normal condition. Then I made a well-fitting plate without a vacuum chamber, and she has had no further trouble.—R. B. Edson, *Proc. Harriet Newell Lowell Society for Dental Research.*

Atmospheric Pressure in the Retention of Dentures.—Atmospheric pressure, contrary to the opinion of many, is only a negligible factor in the retention of dentures, it being dependent upon a vacuum, or near-vacuum, under the plate. So long as this space remains under the plate atmospheric pressure has some bearing on the retention, depending upon the degree of vacuity obtained, fifteen pounds of pressure to the square inch being the weight of a column of air on a surface from under which all air has been excluded. But the vaccum space cannot be permanent unless it is placed over a hard, unyielding area, in which case it acts as a relief; otherwise the space is soon filled in with the yielding tissue, and the influence of atmospheric pressure is lost, leaving the denture to be retained by the true principle, adhesion by contact.—E. B. Owen, *Dental Summary.*

Making a Workable Cast.—After employing the time, skill, and care necessary to produce a good impression, don't spoil it by using plaster of Paris for the cast. I am not condemning plaster too severely, for many good dentures have been made over it, but knowing its properties of expansion and compressibility as we do, why take chances with it when such materials as Spence's plaster and Weinstein's artificial stone are to be had?

The technique of manipulating these materials is too well known for discussion here. The writer personally prefers Spence's plaster, which must be manipulated and jolted into the impression for two or three minutes in order to give a smooth cast. This jolting requires that some sort of a matrix be built around the impression to confine the cast material. This matrix serves also to preserve the contour of the impression in the cast, which is necessary if we are going to extend the denture accordingly.—E. B. Owen, *Dental Summary.*

Teeth Do Not Control Mandibular Movement.—When building up cusps and carving fissures it will be well to remember that the teeth do not control the mandibular movements. If a cusp or part of a crown is not in harmony with the arcs through which the mandible sweeps in its movements it will wear off, or act as a lever to loosen the tooth upon which it is found. When several teeth are malposed they will to some extent limit the movements of the mandible, but never control it. The mandible will move as freely and as far as the muscles will pull, or the patient chooses to move it, but in all these movements it sweeps through certain arcs of circles that are in harmony with the peculiarity of the anatomics of the case, without any regard to the occlusion or the occlusal surfaces of the units that make up the two arches. If any cusp or series of cusps are so placed that they interfere with these movements, they will be reduced to a point where they are in harmony, or the tooth of which they are a part will be exfoliated, while the mandible swings merrily on in its accustomed arcs.—F. W. Frahm, *Pacific Dental Gazette.*

Ionization in the Treatment of Neuralgia.—Ionization has been successfully used for the treatment of trigeminal neuralgia. The technique consists in covering the whole affected area of the face with a folded cloth pad saturated with warmed solution of two per cent. sodium salicylate. On this is fitted a metal electrode covered with felt, which is securely bandaged in position throughout the application. The indifferent electrode, which is also well covered with lint and moistened with sodium chlorid solution, is placed on the chest, or under the shoulders. The salicylic ions are anions, they are therefore repelled from the negative pole, which is attached to the electrode on the face. The current is turned on gradually and the patient can usually bear 20 to 30 m.a.; the application should last for thirty minutes, and may be repeated three times a week.

Great care must be taken to secure the terminals, so that there is no possibility of sudden break of current.

Quinin ions have also been used successfully for trigeminal neuralgia with the same technique, but the positive pole is here necessary to introduce these cations.—E. Sturridge, *Dental Items of Interest.*

Use of the Toothbrush.—The chief benefits derived from the use of a toothbrush are that it acts as a series of fine toothpicks, thereby removing a part of the loose débris, and that the massaging produces a more healthy condition of the gums. Massaging of the gums, however, can be carried to excess. I do not like to see the gums present a hard, leathery, mottled, pink surface, for this calloused appearance is the result of severe rubbing. There is not good circulation, and infection followed by serumal deposits usually occurs sooner or later, and works rootwise under this kind of tissue. Gum tissue should lie over well-formed bony structure, and should have a good, bright, healthy color, and a network of fine capillaries showing plainly just under the surface. I do not mean hyperemia, but just a good healthy

circulation. As far as I have been able to observe, daily massaging with cotton rolls or cheesecloth napkins increases circulation, but does not cause the gums to become calloused. It is better to take toothbrushes away from patients, if they cannot learn to handle them properly, and have them depend upon the polisher, dental floss, and cotton rolls, for with these they will not injure their teeth or gums. —FRANK H. SKINNER, *Dental Summary.*

Leucoplakia Oris.—Sometimes the mucous membrane of the cheeks, lips, and tongue develops a tendency to take on a grayish-white coating, which is at times irregularly diffused, or decidedly patchy or flaky in appearance. This condition is called leucoplakia oris. It bears a close resemblance to the so-called leucoplakia of syphilis, except that the mucous membrane is quite smooth, and is devoid of the scarlike irregularities of the latter process. A serological examination will establish readily the identity in doubtful cases. The cause of this simple form of leucoplakia is very obscure. Syphilis and immoderate use of tobacco are regarded as predisposing influences by many. On the other hand, leucoplakia is often observed in women who have never incurred an infection of syphilis, and who likewise are not addicted to the use of tobacco. Some of the cases probably are predisposed by chronic gastric hyperacidity, and to the local irritation incident to overindulgence in pungent, acrid, highly spiced foods and condiments. This condition may become exceedingly pronounced in extreme cases, and not infrequently becomes transformed into well-defined malignancy. Its recognition and significance is within the pale of dentistry, with an incurred obligation of proper care and safe conduct.—M. L. HEIDINGSFELD, *Dental Summary.*

Reinforced Silicate Cement Filling.—The future favorite filling for certain selected anterior cavities will be the filling made by grinding a piece of porcelain of proper shade to match the tooth to be filled, and then setting the porcelain with silicate cement.

The piece of porcelain need not be ground so accurately as to fit the cavity perfectly, as the silicate will fill the inequalities and give a harmonious appearance. The porcelain, however, should be large enough to give the tooth its general contour, make a perfect contact point with the approximal tooth, and should form an occlusion with the opposing teeth when the jaw is closed. The porcelain should be of sufficient size to reproduce the general contour of the tooth, so that it will not be necessary for the silicate cement to run over the edges of the porcelain, for the reason that the thin edges will break off later.

This kind of filling has many advantages, and overcomes nearly all the weak points of the silicate filling, such as lack of strength to retain the contact point and insufficient strength to hold on incisal angles or occlusal surfaces.

The inlays are cut from the part of a porcelain tooth which corresponds to the part to be replaced. A broken tooth or a diatoric tooth, or any pieces of a tooth, may be used, just so a piece is obtained that approximately corresponds to the cavity you wish to fill.—E. E. HAVERSTICK, *Dental Summary.*

Indications and Contra-indications for Local Anesthesia.—Almost everyone who has seriously entered the practice of conductive anesthesia has found that with increasing experience in its use he employs it more and more, to the exclusion of the commonly practiced infiltrative type. This is accounted for by the comparative painlessness of the needle insertion and the injection, the small amount of solution required, the absence of after-pain and soreness, and the absolute anesthesia obtained. Patients upon whom it has been used for cavity preparation or surgical procedures are pleased with the results, and request its use on subsequent occasions, and that encourages one to use it with increasing frequency as time goes on. It is not recommended over nor will it ever supplant nitrous oxid for the highly nervous, uncontrollable neurasthenic who dreads operations; for the physically exhausted individual who has been in pain for a number of days; for the child with whom it is difficult to reason, nor for extractions in acute abscess conditions. But for the preparation of the sensitive cavity that does not respond to the ordinary methods of desensitization, for the removal of vital pulps, for root amputations, for extractions, for prolonged and complicated operations such as the removal of unerupted and impacted teeth, for maxillary sinus operations, for the reduction of fractures of the mandible, and for the removal of tumors and cysts about the jaws, it gives complete anesthesia. The patient can be placed in any position in the dental chair that is most convenient to the operator; there is no aspiration or swallowing of blood or mucus, and no nausea, vomiting, or prostration after the operation is over. In fact, the anesthesia will usually last until the patient reaches home, which in itself is highly desirable.—P. G. PUTERBAUGH, *Dental Review.*

Three Bronchoscopic Cases the Result of Dental Procedure.—Dr. Burt R. Shurly of Detroit states that statistics show that possibly 600 cases of the sudden inhalation of foreign bodies during dental procedure have occurred in the United States and Canada. It was therefore important to devise a special protective device.

In the first case the patient stated that her cough dated immediately after extraction of a tooth under nitrous oxid anesthesia. A radiogram showed the tooth. The trachea was not cocainized, and bronchoscopy failed. Tracheotomy and subsequent bronchoscopy resulted in removal and cure.

In the second case the cough followed tooth extraction under nitrous oxid. There was a marked odor of rubber. The air supply of the lower part of the lung was cut off, and a piece of hard rubber, which had been part of a dental mouth-gag, was brought up to the trachea, slipped from the forceps, but fortunately was coughed up soon after by the patient.

In the third case the patient was receiving treatment from a dentist preparatory to filling the root-canal of a tooth. The canal was treated with a dental broach, which was held between the thumb and forefinger during the process of application. This tiny instrument suddenly slipped and was inspirated into a lower division of the left bronchus. After this remained in the bronchus for ten days, the X-ray examination with antero-posterior and lateral plates showed a shadow in the lower left thoracic region, which it was believed was a metallic foreign body in the lower left bronchus. After a thorough application of novocain to the respiratory passage, with cocainization advanced as the tube was introduced, and followed to within the lowest terminations possible, this foreign body was extracted, which was pointing with the needle part upward. The patient recovered completely without symptoms.

Interesting cases of the swallowing or inhaling of various articles of dental equipment were reported by Dr. Thomas Hubbard of Toledo, Dr. Harmon Smith of New York, Dr. Carl E. Munger of Waterbury, Conn., Dr. Albert C. Getchell of Worcester, Dr. Bryson Delavan of New York, Dr. Emil Mayer of New York, Dr. Robert C. Lynch of New Orleans, and Dr. Stanton Friedberg of Chicago.—*N. Y. Med. Journal.*

Technique for Packing Amalgam.—Contrary to the usual method of removing the excess mercury before packing into the cavity, this semi-plastic mass is used for producing the filling, as it is practically impossible to pack amalgam into the cavity and adapt the margins when the excess mercury has been removed before the packing begins. The mixed amalgam should never be cut into squares and placed on the operating table, but an assistant should keep the mass moving between the fingers all the time. Portions of this plastic mass are carried to the cavity and patted down by numerous taps with the condensing instrument, thus causing the amalgam to flow into the cavity. Large instruments are used for this purpose, but the finer adaptation is done with a much smaller instrument. The excess mercury is removed from the filling during the packing process. It is readily seen that it is much easier to adapt a plastic mass to the margins than one which is so stiff that it is impossible to make it flow. It is just as difficult to adapt amalgam to the margins of a cavity as it is gold, and no amount of burnishing will make a margin tight unless the material has been adapted during the process of packing.

When the amalgam has been carried to the bottom of the cavity by the larger instrument, a smaller one, having a tread of about two millimeters, is used for adapting the material to the margins. I prefer the square-end serrated instruments. The margins are carefully gone over, stepping one-half the width of the instrument from the center toward the buccal and lingual margins. This stepping brings the excess mercury to the surface, where it is easily removed with the packing instrument. Another layer is carried down in the same manner in fairly large quantities, tapping it down with light blows with a four-millimeter plugger, and packing down each layer with a smaller instrument. Remove the excess mercury when the margins are all covered.—Thos. P. Hinman, *Dental Items of Interest.*

HINTS, QUERIES, AND COMMENTS

Casting Zinc Electrode Points for Ionization.

To the Editor of the Dental Cosmos:

In the ionization of root-canals the zinc electrode points are easily made by casting with any centrifugal casting apparatus as follows:

Fill an investment ring with a fine investment, and insert from ten to fifteen ordinary needles the size you wish the points to be. Allow the investment to harden, remove the needles, dry out, and cast.

Fred. A. Kotts.

Toledo, Ohio.

OBITUARY

Dr. John R. Callahan.

[See Frontispiece.]

Died, Tuesday, February 12, 1918, at Cincinnati, Ohio, of apoplexy, in his sixty-fifth year, John Ross Callahan, D.D.S.

Dr. Callahan was born June 28, 1853, at Higginsport, Ross county, Ohio, the son of Dr. Dennis Callahan and Sarah Ross Callahan. Dr. Callahan's father was a minister in his early years, and later became a physician and dentist, which professions he practiced until the time of his death.

Dr. Callahan's early education was obtained in the Hillsboro, Ohio, schools. He began the study of dentistry under Dr. John Ellis, who was associated with his father in Hillsboro in the early '70's. He later entered the Philadelphia Dental College, and was graduated from that institution in 1877. After his graduation he began the practice of his profession in San Francisco, Cal. Two years later he returned to Hillsboro, Ohio, and continued the practice of dentistry at that place until 1890, when he removed to Cincinnati, Ohio, where he succeeded to the practice of Dr. C. R. Taft, brother of the late Jonathan Taft, and practiced until the time of his death.

Dr. Callahan was active in national and local dental affairs, being a member of the National Dental Association, and of the Ohio Dental Society, which latter he served for several years in the capacity of secretary, and in 1891 as president. He was a member of the Cincinnati Dental Society, and president in 1906–07.

Dr. Callahan was for many years head of the dental department of the Cincinnati General Hospital, at which institution he did very valuable work, and was largely instrumental in bringing about a closer co-operation between the dental and medical professions in Cincinnati and vicinity. He was director of the Research Club of Cincinnati, a member of the Cincinnati Research Society, and honorary member of numerous state and local societies.

Dr. Callahan possessed naturally a scientific turn of mind, and from the beginning of his career as a dentist was deeply interested in research work. As a result of his studies and investigation in the treatment of root-canals he gave to the profession a method, now known by his name, for the treatment of putrescent root-canals by means of sulfuric acid,* which is today one of the most

* "Sulfuric Acid for Opening Root-canals," Dental Cosmos, 1894, pp. 329 and 957.

successful and generally used methods for the purpose of opening and cleaning root-canals. He later gave to the profession a method of filling root-canals with rosin,* which is in general use at the present time.

In recognition of the valuable scientific research work which Dr. Callahan did, the results of which he so freely gave to the profession, the New York State Dental Society in 1917 presented to him the Jarvie Fellowship Medal, one of the highest honors that can come to a member of the dental profession in America. At this same meeting of the New York Dental Society at which he received the Jarvie Fellowship Medal, he presented a paper on "Logical Asepsis in Dental Practice," † in which he gave the results of extensive experimental research work in an effort to impress upon the profession the importance of asepsis in dental practice.

Dr. Callahan was married to Miss Sarah Ann Stephenson, Hillsboro, Ohio, in 1891. He is survived by a widow and three children. The funeral services were held in the Cincinnati Crematory, Friday, February 15, 1918, after which his body was cremated.

The following editorial tribute to Dr. Callahan, in the Cincinnati *Times-Star* for February 15th, is a just appreciation by one who knew Dr. Callahan both professionally and as a friend during many years:

"The death of Dr. John R. Callahan is a great loss to dental science. Dr. Callahan's professional activities took him far beyond the routine of his practice. He labored for the general advancement of his profession, and had no small share in widening the scope of dentistry until it became one of the important factors in general diagnostics. From his laboratory came many contributions to dental science, the harvest of experimentation as unselfish as valuable. The scientific imagination was one of Dr. Callahan's attributes, the ability to see beyond the immediate causes into the causes of causes, to trace symptoms to their source instead of being satisfied with superficial manifestations.

"There is something heroic about a professional career that so quietly contributes to the general good of humanity. There is no perfervid appeal to 'the peepul' to recognize service in their behalf. The emoluments are in no sense commensurate with the achievements. The effort finds its reward largely in the effort itself, and in its scientific fruition. Any praise from the outside world comes largely from the few possessed of the special knowledge that equips them for appreciation.

"Such was Dr. Callahan's career—the unselfish labor of a scientist in humanity's behalf. He worked hard, accomplished much, and received his meed of praise from those familiar with his achievements. The greatest tragedy of his death lies in the things that he would still have accomplished, and which he was forced to relinquish to other heads and hands."

The following resolution was passed by the Chicago Dental Society on the death of Dr. Callahan:

Whereas, the Chicago Dental Society have learned of the sudden death of Dr. John R. Callahan; and

Whereas, Dr. Callahan always stood for the highest and best in the dental profession; and

Whereas, he was conspicuously known for his ability, integrity, and scientific attainment; therefore be it

RESOLVED, That we, the members of the Chicago Dental Society, wish to go on record as expressing our loving memory of his faithful and fruitful life and our sincerest sorrow at his death.

W. H. TAGGART, *Chairman*,
C. N. JOHNSON,
T. L. GILMER,
Committee.

Dr. Joseph Lemuel Mewborn.

DIED, Saturday, December 15, 1917, at his home in Memphis, Tenn., from acute indigestion, after an illness of only three days, in his eightieth year, JOSEPH LEMUEL MEWBORN, D.D.S.

Dr. Mewborn was born in Madison county, Ala., near Huntsville, on March 3, 1838, the son of Charlton Augustus and Mary Jane (Long) Mewborn. His early education was procured in the schools of his vicinity, and later in the Macon Masonic College and the LaGrange Synodical College of Tennessee.

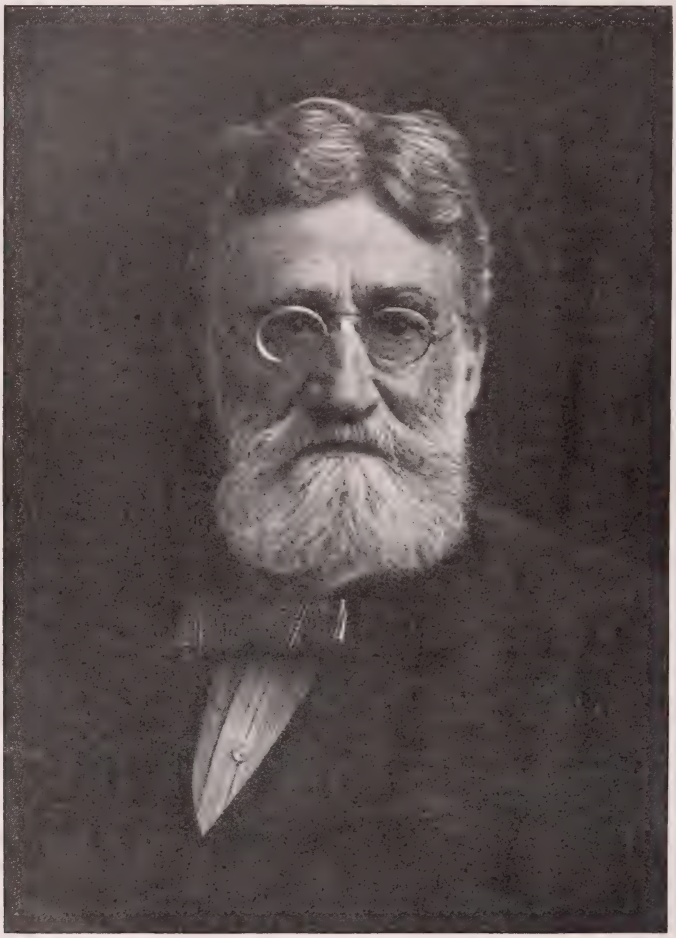
* "The Method of Filling Root-canals by Means of a Rosin Compound," *Dental Summary*, 1914, p. 775.

† "Logical Asepsis in Dental Practice," DENTAL COSMOS, 1918, p. 31.

When the civil war broke out, Dr. Mewborn enlisted in the Confederate army, and was soon made a second lieutenant in the 13th Tennessee Infantry. He was present at the first battle of Manassas. In the last year of the war he was captured, and it was while a prisoner at Johnson's Island on Lake Erie that he began the study of dentistry.

At the close of the war he continued the study of dentistry under Dr. W. R. Johns of Somerville, Tenn. He later entered the New York College of Dentistry, and was graduated from that institution with high honors in 1871. Immediately after his graduation he entered the practice of dentistry with his former preceptor, Dr. Johns, at Somerville. A few years later he removed to Memphis, Tenn., where he continued to practice until the time of his death. He was in continuous practice for fifty-two years.

Dr. Mewborn was a member of the Tennessee State Dental Association, serving it in the capacity of vice-president and president; a member of the American Dental Association, the Southern Dental Association, and the Southern Branch of the National Dental Association. He was one of the organizers of the Memphis Dental Society, and served on the Tennessee State Board of Dental Examiners for twelve years.



DR. JOSEPH LEMUEL MEWBORN.

Dr. Mewborn was always eager and willing to serve in any capacity for the upbuilding of his profession. He was a close student of dentistry, and next to his family and home he loved his colleagues and the dental profession. He played an important part in securing legislation in Tennessee, governing the practice of dentistry, which has placed the state second to no other commonwealth regarding the high standards which must be attained by all members of the profession.

One of the most impressive expressions of the high regard in which Dr. Mewborn was held by his associates was shown him by the dentists of Memphis upon the occasion of a banquet given by the Memphis Dental Society on May 12th in his honor. After many beautiful expressions of love and esteem from those present, he was presented with a handsome gold-headed cane bearing the following inscription: "Presented to Dr. J. L. Mewborn by the members of the Memphis Dental Society in token of their high esteem for his long years of loyalty and unparalleled usefulness to the profession, 1912." This occasion always remained in Dr. Mewborn's memory as one of the happiest events of his life, and one to which he often referred with pride.

Dr. Mewborn was married to Miss Mary Anne Mathews November 20, 1866, in Macon, Tenn. He is survived by his wife and eight children. The funeral services were held at his home December 17, 1917, and interment took place in the mausoleum at Forest Hill Cemetery, Memphis.

The Memphis Dental Society passed the following memorial resolutions on the death of Dr. Mewborn:

In Memoriam

DR. JOSEPH LEMUEL MEWBORN.

"Let me not follow the glamor of the world,
But walk calmly in my path.
Give me a few friends who will love me
For what I am; and keep ever burning before
My vagrant steps the kindly light of hope;
And though age and infirmity overtake me
And I come not in sight of the castles of my dreams,
Teach me still to be thankful
For life, and for time's golden moments
That are fond and sweet; and may the evening
Twilight find me gentle still."

Whereas, by the death of our honored and esteemed colleague, leader, and friend, Dr. Joseph Lemuel Mewborn, the Memphis Dental Society feels that it has been sorely bereaved in a personal manner as well as professionally: Personally, because of his courteous and cheerful conduct in our everyday social relations. His attitude toward us has ever been of the most kind and considerate nature, and will remain with us as a precious memory. Professionally, we shall miss his wise and experienced counsel and his deep interest in and devotion to our work. He was ever ready to make needed sacrifice of time and talent for his beloved profession, to which he gave so many years of valuable service.

Perhaps the feature of his character which was most admirable was the impeccable soundness of his moral fiber. Indecision and indirection were foreign to his nature, and to all the activities of his long, honorable, and useful career he brought sterling integrity and absolute loyalty to truth.

Uniformly urbane and courteous in social intercourse, he was in the highest sense a gentleman. When aroused, he had at command large potencies of incisive speech with which to enforce a lesson, expose a fallacy, or condemn a wrong. A veteran in dentistry, he was a pioneer in all those progressive advances which finally culminated in its organization and recognition as a distinct professional body. And

Whereas, in the passing away of our beloved friend we have the assurance that God our all-wise Heavenly Father has taken him unto His bosom; therefore be it

RESOLVED, That the Memphis Dental Society extends its sincere sympathy to Mrs. Mewborn and to the sons and daughters in their bereavement, which is the sorrow of each and every member of the society and the profession at large. We wish to express our high regard for the worth and character of this loving and lovable man.

At the banquet of the Golden Jubilee of the Tennessee State Association, 1917, Dr. Mewborn closed his memorable and beautiful response to the toast "Reminiscences of Long Ago," with the following lines, which seem to have been anticipatory and prophetic:

Here is a toast I want to drink
To the fellow I 'll never know—
To the fellow who 'll take my place
When it 's time for me to go.

I 've wondered what kind of a chap he 'll be,
I 've wished I could take his hand,
Just to whisper, "Wish you well, old man!"
In a way that he 'd understand.

I 'd like to give him the cheering word
The word I 've longed to hear;
I 'd like to give him the warm handclasp
When never a friend seems near.

I 've learned my knowledge by sheer hard work,
And I wish I could pass it on
To the fellow who 'll take my place
Some day, when I am gone.

Then here 's to your health, old chap!
I drink as a bridegroom to his bride;
I leave an unfinished task for you,
But God knows that I have tried.

I 've dreamed my dreams, as all men do,
But never a word came true;
My prayer today is that all my dreams
May be realized by you.

And we 'll meet some day in the Great Unknown,
Out in the realms of space:
You 'll know my clasp as I take your hand
And gaze in your tired face.

Then all your failures will be success
In the light of the new-found dawn!
So I 'm drinking your health, old chap,
Who 'll take my place when I 'm gone.

Dr. Robert Hopkins Moffitt.

Died, Wednesday, January 16, 1918, at his home in Harrisburg, Pa., of pneumonia, in his seventy-fifth year, Robert Hopkins Moffitt, D.D.S.

Dr. Moffitt was born in Springfield, Ohio, May 3, 1843, the son of John J. and Charlotte Epley Moffitt. His parents, while he was still a boy, moved to Cadiz, Ohio, where he obtained his early education.

Dr. Moffitt began the study of dentistry when a young man under the tutelage of his father. He established himself in practice in York, Pa., shortly before the civil war, and remained there until 1862, when he enlisted in the Ninth Ohio Cavalry and served in the medical corps of the Federal army during three years of the war.

After the civil war closed he went to Harrisburg, Pa., where he again took up the practice of dentistry, attending the Philadelphia Dental College later and being graduated from that institution in 1874. Dr. Moffitt gave up the practice of dentistry some twenty years ago, and devoted his time to business, banking, real estate, etc.

Dr. Moffitt was a pioneer in porcelain and continuous gum-work, with his brother, Dr. J. W. Moffitt, the two sons having obtained their early training in this work in West Virginia, from their father, who was a dentist and Methodist minister.

Dr. Moffitt was one of the founders of the Harris Dental Society, a member of the Lebanon Valley Dental Society, and a member of the Pennsylvania State Dental Society, serving the latter in the capacity of secretary in its early days, and aided materially in procuring the legislation which resulted in the establishment of the state society.

Dr. Moffitt was active in church work as well as in business, in the later years of his life. He helped to found the West Market Mission, which afterward became the Westminster Presbyterian Church at Harrisburg. He was a director in the Commonwealth Trust Co. and president of the board of trustees of the Market Square Presbyterian Church. He was largely interested in civic affairs, and took an active part in real estate developments in various sections of the city.

He was married April 26, 1870, to Miss Rebecca Whitman in Harrisburg, Pa. He is survived by seven children, one of whom, Dr. G. R. Moffitt, is a practitioner of medicine in Harrisburg, and another, Dr. J. J. Moffitt, a practitioner of dentistry in Harrisburg.

The funeral services were held January 19, 1918, and interment took place in the Harrisburg Cemetery.

"In Memoriam" Resolutions.

Dr. Fred M. Smith.

The following "in memoriam" resolutions were adopted by the Academy of Stomatology of Philadelphia, March 6, 1918:

Whereas, death has removed from us our friend and fellow-member, Dr. Fred Maurice Smith; and

Whereas, the dental profession by his death has lost one who was consciencious and up-

right in all that pertained to its usefulness and influence, and society, through his clear judgment and unselfish interest, a useful member; therefore be it

RESOLVED, That the Academy of Stomatology, deploring his death, extends its sympathies to his bereaved wife and mother. It will ever bear in memory its association with him. And be it

RESOLVED, That a copy of these resolutions be sent to the bereaved ones, that a record of them be made in the minutes of the Academy, and a copy sent to the DENTAL COSMOS for publication.

J. V. MERSHON,
R. G. BEALE.
S. B. LUCKIE.
Committee.

AT the annual meeting of the Dental Society of Chester and Delaware Counties, held January 23, 1918, the society adopted the following resolutions:

Whereas, the Supreme Ruler of the universe has, in His infinite wisdom, removed from the scene of his earthly labors our esteemed friend and colleague Fred Maurice Smith; and

Whereas, The Dental Society of Chester and Delaware Counties, of which he was a useful and honored member, recognizing his faithfulness as a member, desires to record its appreciation of him as a man, and its sense of sorrow and loss at his death; therefore be it

RESOLVED, That this society extends to the widow and mother of our deceased member its sincere sympathy in their bereavement; that this resolution be spread upon the minutes of the Dental Society of Chester and Delaware Counties, and that a copy be forwarded to the DENTAL COSMOS for publication.

G. B. LUCKIE.
ROBERT M. SCOTT,
D. W. GODON,
Committee.

DENTAL LEGISLATION

Proposed Legislation for the Navy Dental Corps.

BILL INTRODUCED IN THE SENATE [S. 3749] BY SENATOR TILLMAN, AND IN THE HOUSE OF REPRESENTATIVES [H. R. 10724] BY MR. DYER.

A BILL

TO REORGANIZE THE DENTAL CORPS OF THE NAVY, AND FOR OTHER PURPOSES.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

That the Act approved August twenty-ninth, nineteen hundred and sixteen, entitled "An Act making appropriations for the Naval Service for the fiscal year ending June thirtieth, nineteen hundred and seventeen, and for other purposes" (Statutes at Large, volume 39, chapter 417, pages 573 and 574) be, and the same is hereby, amended by striking out all of said Act following the caption "Naval Dental Corps," on page 573, but preceding the caption "Dental Reserve Corps," on page 574, and by substituting therefor the following:

That the President of the United States is hereby authorized to appoint and commission, by and with the advice and consent of the Senate, dental officers in the Navy at the rate of one for each thousand of the total authorized number of officers and enlisted men of the Navy and Marine Corps, in the grades of assistant dental surgeon, passed assistant dental surgeon, and dental surgeon, who shall constitute the Naval Dental Corps, and shall be a part of the Medical Department of the Navy. Original appointments to the Naval Dental Corps shall be made in the grade of assistant dental surgeon with the rank of lieutenant (junior grade), and all dental officers now in the Dental Corps, ap-

pointed under the provisions of the Act of Congress approved August twenty-ninth, nineteen hundred and sixteen (Statutes at Large, volume 39, page 573), or who may hereafter be appointed, shall take rank and precedence with officers of the Naval Medical Corps of the same rank according to the dates of their respective commissions, and dental officers shall be eligible for advancement in grade and rank in the same manner and under the same conditions as officers of the Naval Medical Corps with or next after whom they take precedence, and shall receive the same pay and allowances as officers of corresponding rank and length of service in the Naval Medical Corps up to and including the rank of lieutenant commander: *Provided*, That dental surgeons shall be eligible for advancement in pay and allowances, but not in rank, to and including the pay and allowances of captain, subject to such examinations as the Secretary of the Navy may prescribe, except that the number of dental surgeons with the pay and allowances of captain shall not exceed four and one-half per centum and the number of dental surgeons with the pay and allowances of commander shall not exceed eight per centum of the total authorized number of dental officers: *Provided further*, That dental surgeons shall be eligible for advancement to the pay and allowances of commander and captain when their total active service as dental officers in the Navy is such that if rendered as officers of the Naval Medical Corps it would place them in the list of medical officers with the rank, pay, and allowances of commander or captain, as the case may be: *And provided further*, That dental officers who shall have gained or lost numbers on the Navy list shall be considered to have gained or lost service accordingly; and the time served by dental officers on active duty as acting assistant dental surgeons and assistant dental surgeons under provisions of law existing prior to the passage of this Act shall be reckoned in computing the increased service pay and service for promotion of dental officers herein authorized or heretofore appointed.

All appointees authorized by this Act shall be citizens of the United States between twenty-one and thirty-two years of age, and shall be graduates of standard medical or dental colleges and trained in the several branches of dentistry, and shall, before appointment, have successfully passed mental, moral, physical, and professional examinations before medical and professional examining boards appointed by the Secretary of the Navy, and have been recommended for appointment by such boards: *Provided*, That hereafter no person shall be appointed as assistant surgeon in the Navy who is not a graduate of a standard medical college.

Officers of the Naval Dental Corps shall become eligible for retirement in the same manner and under the same conditions as now prescribed by law for officers of the Naval Medical Corps, except that section 1445 of the Revised Statutes of the United States shall not be applicable to dental officers, and they shall not be entitled to rank above lieutenant commander on the retired list, or to retired pay above that of captain.

All dental officers now serving under probationary appointments shall become immediately eligible for permanent appointment under the provisions of this Act, subject to the examinations prescribed by the Secretary of the Navy for original appointment as dental surgeon, and may be appointed assistant dental surgeon with the rank of lieutenant (junior grade) to rank from the date of their probationary appointments: *Provided*, That the senior dental officer now at the United States Naval Academy shall not be displaced by the provisions of this Act, and he shall hereafter have the grade of passed assistant dental surgeon and the rank, pay, and allowances of lieutenant, and he shall not be eligible for retirement before he has reached the age of seventy years, except for physical disability incurred in the line of duty: *Provided further*, That no dental officer in the Navy who on original appointment as dental officer was over forty years of age, shall be eligible for retirement before he has reached the age of seventy years, except for physical disability incurred in line of duty.

All Acts or parts of Acts inconsistent with the provisions of this Act are hereby repealed: *Provided*, That nothing herein shall be construed to reduce the rank, pay, or allowances now authorized by law for any officer of the Navy.

ARMY AND NAVY DENTAL NEWS

[FOR PROPOSED LEGISLATION FOR THE NAVY DENTAL CORPS, SEE PRESENT ISSUE OF THE DENTAL COSMOS, PAGE 365, GIVING THE BILL NOW IN CONGRESS; SEE ALSO "PENDING NAVAL DENTAL LEGISLATION" (EDITORIAL), PAGE 344.]

Medical Department Training.

DENTAL OFFICERS.

THE first class of dental officers to be sent to the medical officers' training camp at Fort Oglethorpe, Ga., will commence the course of instruction on March 15th. The course will last for two months. During the first month about 180 hours will be devoted to general military subjects, and during the second month about 71 hours to these subjects and 100 hours to special dental subjects. The military staff already at the training camp will conduct the military instruction. Lieut.-Col. John H. Snapp, dental corps, has been relieved from duty at Camp Upton, N. Y., and assigned to duty as senior dental instructor at Fort Oglethorpe. He will be assisted by several members of the dental corps and by a staff of members of the dental reserve corps who have had experience, before entering the military service, as special instructors at dental colleges. It is planned to send to the camp each month a class of about eighty-five dentists, of whom all that can be spared from their present duties will be recent appointees to the dental corps, with a sufficient number from the dental reserve corps to make up the prescribed number. Preparations are being made for erection of special buildings for use in conducting the instruction in dental subjects. Plans for a general enlargement of the scope of training various classes of the *personnel* of the medical department at Fort Oglethorpe are awaiting approval. Besides the dentists, commissioned and enlisted members of the sanitary corps and veterinary corps also are to be put through special courses of instruction pertaining to their special work, some members of the sanitary corps already having been sent there. At present there are about 1500 officers and 9000 enlisted men of the medical department at the camp. A similar camp has been conducted at Fort Riley, Kans., where there are about 1000 officers and 6500 enlisted men. While it is not intended to discontinue the Fort Riley establishment immediately, the plans that are being made contemplate a gradual enlargement of the facilities and scope of work at Fort Oglethorpe, to the end that the educational system of the Medical department, so far as it may be conducted at a training camp, eventually will be concentrated at that place, with a corresponding diminution at other places.

PLANS continue in course of development for increasing the size and scope of the establishment at Fort Oglethorpe, Ga., for the training of different classes of *personnel* of the Medical department, with a view to the ultimate concentration at that place of so much of the medical and allied educational system as may be conducted at a training camp. Brigadier-gen. Henry P. Birmingham, medical corps, national army, has been assigned to command the camp. He has been relieved from duty at Washington in the office of the Surgeon-general of the army and ordered to proceed to Fort Riley, Kans., for the purpose of inspecting the medical officers' training camp at that post and then to proceed to Fort Oglethorpe for station. Besides training of medical officers, training also will be given to members of the dental corps, dental reserve corps, sanitary corps, and veterinary corps. The first class of dentists, made up of fifty members of the regular corps and thirty-five members of the reserve corps, commenced the two months' course of instruction on March 15th. Lieut.-col. John H. Snapp, dental corps, is the senior dental instructor, and he is assisted by Majors Ben H. Sherrard and E. Henry Valentine, of the dental corps, and Major John D. Eby, of the dental reserve corps. Among the new schools to be established at Fort Oglethorpe is one for the physical diagnosis of lung diseases, with Captains William N. Anderson, Henry C. Drew, and James W. Price, medical reserve corps, as instructors.—*Army and Navy Register.*

Medical Corps Commissions.

Something of a muddle has resulted from conflicting decisions regarding the authorized enlisted strength of the regular army as a basis for determining the number of officers allowed the Medical corps and Dental corps, Sect. 10 of the National Defense Act of June 3, 1916, providing that—"The total number of such officers shall approximately be equal to, but not exceed, except as hereinafter provided, seven for every one thousand of the total enlisted strength of the regular army authorized from time to time by law;" and also authorizing the appointment of dental surgeons "at the rate of one for each one thousand enlisted men of the line of the army."

By one decision a strength of approximately 300,000 was used as a basis for determining the allowance of officers of the medical corps; the numbers in the several grades were adjusted on this basis, and some officers were nominated, confirmed, and commissioned in higher grades on this basis. It was claimed in behalf of the medical officers that the temporary strength prescribed from time to time for the signal corps in accordance with the Aviation Act of July 24, 1917, should be included in computing the strength of the regular army for determining the allowance of officers of the medical corps, and that a strength of approximately 450.000 should be used at this time as a basis.

The matter was reconsidered by the Judge Advocate-general of the army and by the general staff, and now it has been decided that the temporary strength of the signal corps and some other factors proposed by the Surgeon-general's office should not be included, and that the number of officers of the medical corps should be determined on a basis of about 213,000 enlisted men. With a computation of the allowance on the latter basis, it is found that the number of medical officers commissioned in higher grades exceeds the allowance.

It becomes at once a question as to what may be done in the cases of these excess officers. Their commissions having been issued after confirmation by the Senate, they cannot now be recalled, and naturally the officers affected are reluctant to surrender them. So far as it has been determined, it probably will be necessary to carry them in these grades as supernumeraries, to be absorbed later as vacancies occur. While the decision does not affect the dental officers to such an extent as the medical officers, for the reason that it is prescribed that their numbers shall be based on the number of enlisted men in the "line" of the army, it does affect indirectly a determination of their allowance, but so far no excess commissions in higher grades have been issued.—*Army and Navy Register.*

Medical Students Commissioned.

Under a recent arrangement between the Navy and War departments, the privilege has been extended to enrolled medical and dental students to accept commissions in the medical corps of either branch of the service. The privilege applies to either the army or the navy; that is, an enrolled medical student of the naval reserve force may accept a commission in the medical reserve corps of the army, and *vice versa.* To be relieved, however, of his obligation as an enrolled enlisted man, he must accept active duty, for no enrolled students will be disenrolled in order to accept a commission in the inactive reserve in the other branch of the service. The operations of the selective draft law had the effect of greatly increasing the number of enrolments of medical and dental students, particularly in the naval reserve force. These men will be permitted to pursue their course of instruction until they graduate, when they will probably be called to active duty and instruction in hospitals and at training stations. It is not expected that undergraduates will be assigned to active duty during their vacation period.—*Army and Navy Register.*

Navy's Call for Binoculars, Spy Glasses and Telescopes.

"The Eyes of the Navy."

Mr. Franklin D. Roosevelt, assistant secretary of the navy, announces that the navy is still in urgent need of binoculars, spy glasses, and telescopes. The use of the submarine has so changed naval warfare that more "eyes" are needed on every ship, in order that a constant and efficient lookout may be maintained. Sextants and chronometers are also urgently required.

Heretofore, the United States has been obliged to rely almost entirely on foreign countries for its supply of such articles. These channels of supply are now closed, and as no stock is on hand in this country to meet the present emergency, it has become necessary to appeal to the patriotism of private owners to furnish "eyes for the navy."

Several weeks ago, an appeal was made through the daily press, resulting in the receipt of over 3000 glasses of various kinds, the great majority of which have proved satisfactory for naval use. This number, however, is wholly insufficient, and the navy needs many thousands more. He therefore asks that subscribers give special attention to this call.

All articles should be securely tagged, giving the name and address of the donor, and forwarded by mail or express to the Hon. Franklin D. Roosevelt, assistant secretary of the navy, care of Naval Observatory, Washington, D. C., so that they may be acknowledged by him.

Articles not suitable for naval use will be returned to the sender. Those accepted will be keyed, so that the name and address of the donor will be permanently recorded at the Navy Department, and every effort will be made to return them, with added historical interest, at the termination of the war. It is of course impossible to guarantee them against damage or loss.

As the Government cannot, under the law, accept services or material without making some payment therefor, one dollar will be paid for each article accepted, which sum will constitute the rental price, or in the event of loss, the purchase price, of such article.

Navy Needs No More Dental Students.

Enrolments of dental students in the Naval Hospital Corps Reserve have been suspended, a sufficient number of embryo dentists having been obtained to meet the navy's needs for the present. About three hundred students of this class were enrolled. Enrolments of medical students will continue indefinitely, under the same conditions as enrolments have been conducted for the reserve during the past few months. The regular hospital corps of the navy is filled to its legal capacity, but with the increase in the enlisted *personnel* which has been recommended by Secretary Daniels, there will be an automatic increase in the complement of the hospital corps, bringing the strength up to over 9000, and active enlistments will be resumed. The hospital corps has proved very popular since the legislation of 1916 putting the corps on the same basis as other branches of the navy, and transfers in increasing numbers are being made from other branches of the navy and of the marine corps.—*Army and Navy Register.*

Army Dental Corps.

It was expected there would be about 250 vacancies to be filled in the Army Dental Corps, but in view of the new ruling as to enlisted strength of the army, upon which the *personnel* of the dental corps is based, the actual vacancies have been reduced to two. There were 211 in the dental corps, which is entitled to 212, and recently one officer was retired for physical disability. With a knowledge of but two vacancies existing, it is not expected that many of the 375 candidates who were invited to appear before examining boards on March 11th really presented themselves.—*Army and Navy Register.*

New Appointments—Army Dental Corps.

To be Dental Surgeons with the rank of lieutenant (junior grade) for a probationary period from October 16th: W. T. Davidson, H. A. Badger, P. F. Kennedy, Canute Hansen, H. A. Sturtevant, L. E. McGourty, S. O. Claytor, J. McK. Campbell, J. W. Ridgway, Hyman Mann, Hubert Lehman, J. A. Walsh, W. E. Coverley, and W. A. Dorney.

The following from November 1st: D. L. Cohen and E. B. Faxon.

The following from February 9th: H. R. McCleery, A. T. Fellows, G. A. Collins, F. A. Zastrow and J. F. McGrath.

Advancement in Rank—Dental Reserve Corps. (March 2d.)

The promotion of the following-named first lieutenants is announced:

To be Majors: Archibald L. Miller, Albert Mehrer, Walter H. Richardson, Grove W. Dunham, Sherman M. Fowler, Donald D. Cornell, Ernest O. Lawing, and John Voss.

To be Captains: 1st Lieuts. Edwin H. Smith, Charles W. Swing, Philip H. Woods, Walter E. Lotz, Wm. G. Buchanan, Wm. W. Peebles, James E. Johnson, Thereon J. Hickey, George A. Withrow, James T. Cannon, Walter LeR. Wilson, Victor I. Buss, Floyd E. West, Wm. R. Cashin, Arthur A. Hoffman, Albert W. Anderson, Wm. E. Boyle, Edgar T. Blocher, George H. Elliott, Charles H. Masters, Charles A. McDermand, Frank R. Woods, James W. Ferguson, DeWilton H. Milstead, Jesse J. Corlew, John F. Clark, Edward F. Lafitte, Edwin C. Baker, Louis A. Haffner, Louis H. Caderette, Joseph A. Corriveau, George V. Cannon, Wm. M. Bergan, Irving P. Carr, James E. Cox, George N. Abbott, David S. Bedrick, Wilbur A. Charron, Wm. L. Davidson, Wm. P. Delafield, Wm. A. Walzem, Milton H. Anderson, Walter Sorenson, Charles J. Meyer, Thomas J. Guilfoil, James

H. Keith, Walter Grandage, Thomas E. Power, Frederick W. Day, Wm. B. Cobb, John J. Lally, Frank L. Hardy, Wm. R. Beattie, Sperry B. Claypool, Roy A. Stout, Albert E. Thornberry, Shubael C. Stratton, Albert W. Farley, Warren E. Guerrier, Cornelius Locke, Harrison B. Wall, Clarence P. Landgrebe, Oakley B. Davy, Max C. Frazier, Charles F. Huber, Claude L. Hunsicker, James W. McGuire, Thomas L. Rice, and Stanton L. Sherman.

To be MAJORS (March 9th): 1st Lieuts. Joseph D. Eby, Oscar LeRoy Whitson, Ernest Eugene Buell, Harry Paulus Bachman, and Wilbert J. Scruton.

To be CAPTAINS (March 9th): Daniel T. Bowers, David G. Everhart, Melvin M. Augenstein, Wm. O. Boss, Fred Tiesse, Jr., John C. McElhaney, Wm. B. Noble, Denzil C. Barnhill, Ernest E. Boyd, Albert L. Bruener, Walter T. Clark, and Gordon L. Ross.

To be MAJORS (March 16th): 1st Lieuts. Joseph A. Boarts and John McD. Eveleth.

Assignments.

Army Dental Corps.

Week ending February 16th.

1st Lieut. Glover Johns from duty at Camp MacArthur, Tex., to Fort Sam Houston for duty.

1st Lieut. Joseph E. Schaefer from duty at Camp Meade, Md., to Surgeon-general's office for temporary duty.

The following to Philadelphia, School of Plastic and Oral Surgery, Evans Dental Institute, for instruction and return to proper station: 1st Lieuts. Wm. J. R. Akeroyd, Frederick C. Daniels, and Julius L. Bischof.

The following upon arrival in United States to Washington for examination for promotion: Majors Charles C. Mann and Arthur J. Skillman; and Major Mann to Columbus Barracks for duty, and Major Skillman to Camp Upton, N. Y., 77th division, for duty.

Week ending February 23d.

Major Arthur J. Skillman to Chillicothe, Ohio, Camp Sherman, for duty.

Week ending March 2d.

Lieut. Col. John H. Snapp from duty at Camp Upton, N. Y., to Fort Oglethorpe, medical officers' training camp, for duty as senior dental instructor.

Week ending March 9th.

Leave for three months on surgeon's certificate granted Lieut.-col. Raymond E. Ingalls.

Week ending March 16th.

Lieut.-col. George E. Stallman (promoted subject to examination), having been examined for promotion and found physically disqualified for duties of lieut.-col. in dental corps by reason of disability incident to service, his retirement as a lieut.-col. is announced. He will proceed to his home.

Major Arthur J. Skillman to Camp Sherman, Ohio, for duty in base hospital.

1st Lieut. Julius L. Bischof from Evans Dental Institute, Philadelphia, to Camp Joseph E. Johnston, Fla., for temporary duty in base hospital.

The following to Fort Oglethorpe, medical officers' training camp, for duty: 1st Lieuts. Wm. F. Scheumann and John N. White.

The following to Fort Oglethorpe, medical officers' training camp, for course of instruction: 1st Lieuts. Harold A. Curtis, Lawrence J. Dunn, Carl R. Oman, John L. Richards, Thomas H. Veale, and Carl S. Emmer.

Dental Reserve Corps.

Week ending March 9th.

Capt. Cornelius Locke to Panama Canal Department for duty.

Preparedness League of American Dentists.

(Organized under the auspices of the N. D. A.)

The Dental Committee of the General Medical Board, which is the agency for the Medical and Dental Preparedness in this War-emergency has made it possible for every Dentist in the United States to assist in the work, under the supervision of Lieut. Wm. A. Heckard, D.R.C., U.S.A., stationed at 50 East 42d st., New York, N. Y.

Preparedness League Notes and News.

By R. Ottolengui, *Publicity Committee.*

REPORT FROM THE PRESIDENT.

The Preparedness League of American Dentists has now become the recognized medium for carrying on the work relative to the preparation of our men for service prior to their entrance to training camps. It is with pride and a sense of deep satisfaction that I refer to the splendid organization of the League in this particular department of our activities, and I sincerely commend the efforts of those who have given material assistance in bringing about this situation. A development deemed most advisable was the appointment of a director of publicity, to which office Dr. R. Ottolengui was duly elected. I will not anticipate his plan of procedure, but wish merely to assure our members of our satisfaction in his election. and confidence in the results to be obtained through this medium.

The present month of March is the second anniversary of the formation of the League, and indicates the advantage gained by early organization for the promotion of the great work it has undertaken. Our work had continued for a period of fourteen months prior to the declaration of war, and when the word came, the machinery for utilizing the services of our profession was practically completed and oiled ready for use.

We are pleased to announce the *personnel* of the officers of the League elected at our last regular meeting: J. W. Beach, president; O. U. King, Chicago, vice-president; H. C. Brown, Columbus, secretary; L. M. Waugh, New York, treasurer; Lieut. W. A. Heckard, New York, honorary executive secretary, and Chas. F. Ash, New York, director-general. J. Lowe Young and Leland Barrett are members of the Finance Committee, and the subcommittee on Preparedness League of American Dentists, Committee on Dentistry, Council of National Defense, consists of J. W. Beach, chairman; J. A. C. Hoggan, Chas. F. Ash, W. D. Tracy, F. M. Casto, D. M. Gallie, M. B. Eshleman, L. L. Barber.

J. W. Beach, *President.*

REPORT FROM THE DIRECTOR-GENERAL.

We are receiving many letters in which the writer says he has sent in his dollar but has not received his button. Owing to the large number of applications received, running into the thousands, it requires considerable time to tabulate their names and get out the acknowledgments; also there are not enough buttons on hand, and more have been ordered. We ask indulgence in this matter.

I am inclosing also herewith the list of states showing the order in which the printed matter has been mailed. This list will show the extent to which we have endeavored to get into working order the details of the system so as to make it as easy as possible for our directors in the various states. In this way the director the farthest removed will receive his materials and supplies about the same time they are delivered to the nearby states: Porto Rico, Alaska, California, Washington, Oregon, Montana, Idaho, Wyoming, Nevada, Utah, Colorado, Arizona, New Mexico, Texas, Missouri, Iowa, Kansas, Nebraska, North Dakota, South Dakota, Minnesota, Wisconsin, Illinois, Arkansas, Oklahoma, Florida, Alabama, Georgia, South Carolina, North Carolina, Louisiana, Mississippi, Tennessee, Indiana, Kentucky, Michigan, West Virginia, Ohio, Virginia, District of Columbia, Maryland, Delaware, Maine, New Hampshire, Vermont, Massachusetts, Pennsylvania, Rhode Island, Connecticut, New Jersey, New York.

Chas. F. Ash, *Director-general.*

REPORT FROM THE TREASURER.

When we started the recent drive for new members we had 5700 members. On March

1st the total of new members received during January and February amounted to 6707, making a grand total of 12,407.

L. M. WAUGH, *Treasurer.*

REPORTS FROM DIRECTORS OF DEPARTMENTS.

WESTERN DEPARTMENT.

Besides the draft work, which is progressing favorably in this department, we are endeavoring to provide a school of instruction for all dental reserve officers not on duty. In California such a school is to be held at the Dental Department of the University of California and at the Dental Department of the University of Southern California, where it is proposed to have regular dental officers instructing in army regulations, etc. This course will be one week, is open to all dental officers holding commissions, and is free of any cost.

We hope by this method to have the different officers under observation long enough so that we will be able to recommend those qualifying the highest for active duty, and in this way raise the efficiency of the dental corps.

It is thought that this is work for the Preparedness League, as it really prepares the dental officers for their future duties.

Arrangements are being made to have all dental societies located near training camps assist the training camp dental societies with their programs.

JOHN D. MILLIKEN, *Director Western Dept.*

SOUTHERN DEPARTMENT.

The idea of reaching the profession through the dental journals is certainly a good one, but to my mind it does not go far enough. The dire need of this work is publicity that reaches the layman, not the dentist. We have lacked the co-operation of state officials through ignorance of our work. We have had half-hearted response from many dentists who I am sure would jump into the collar if the general public knew of the work. This may not be patriotism, but it is certainly psychology.

I wrote Dr. Ash some time ago about this proposition, asking if there were not some way in which we could advertise this work to the public without mentioning names. I believe if personality creeps into the advertising it will do more harm than good. I offer this merely as a suggestion, and will be glad to have your views in the matter.

W. D. MCCARTY, *Director Southern Dept.*

REPORT OF DIRECTOR OF PUBLICITY.

Dr. W. D. McCarty very well epitomizes the requirements of publicity. I agree with him that publicity through the dental journals will be advantageous, but the publicity that will reach the public will serve us even better. I therefore solicit aid in both directions.

PUBLICITY THROUGH DENTAL JOURNALS.

To thoroughly make use of this medium, the officers and directors should comprehend the method of dissemination and its limitations. All dental journals aim to appear on the first of each month. To accomplish this all copy must be in the hands of the editors by the 10th of the previous month. Some of the journals are nearly five days away from New York by mail. Hence I must have a copy in my hands by the first of each month. It is then arranged, sent to the printer, put into type, and galley proof-sheets mailed to all the dental journals, that the editors may use as much thereof as they may have space for. Thus all matter appearing in the dental journals is at least a month old when put into print. This should be taken into consideration when read. It should likewise be considered when preparing matter for transmission to me. It is difficult to state in advance just what sort of information is desirable. The officers and directors are requested to forward matter with the following basic ends in view: (1) The increase of interest in League work by the dental profession; (2) increase in membership; (3) increase in efficiency. In regard to efficiency, while suggestions are always in order, it should be remembered that the plan that fits the largest number of localities is the best plan. Therefore if the plan that is satisfactory to the majority does not exactly suit you, Mr. Director, adopt it anyway. Alter your own views, rather than the plan. There can be but one plan.

MEDICAL ADVISORY BOARD WORK.

During February a meeting was called of the fifty dentists assigned to medical advisory boards in New York City, and an organization was perfected under the name, "The Dental Committee of the New York Medical Advisory Boards." By this meeting a more coordinate plan of procedure was perfected. By the time of the next big draft we hope to have dentists on all the local exemption boards. As soon as these men have been appointed, a joint meeting of the medical board dentists and the local board dentists will be called,

and the new men will receive the benefit of advice born of experience. It was a satisfaction at the first meeting of the Dental Committee of the New York Medical Advisory Boards to find that everyone was already a member of the League.

LOCAL EXEMPTION BOARDS.

As the local exemption boards will select the majority of the men accepted for active duty, and as these are exactly the men for whom the League desires to work, it is manifest that as quickly as possible we should have dentists on all exemption boards throughout the country. This has already been accomplished in several states, and strenuous efforts are being made to have such appointments made in all states. Therefore, to facilitate progress, it would be well for every state director to begin at once making out lists of men who would volunteer for this patriotic duty. It perhaps would be best to ask the presidents of local societies to select these men. Do it now! Then when the Government announces that appointments to your local boards will be made, and asks for a list of men, you can forward your list by return mail. That would be impressive! That would be efficiency!

SPECIAL NOTICE.

Dental Library Association.

BELIEVING that one of the most important functions of a dental library is the interchange and exchange of dental books and journals, it has been thought advisable by a great many dental librarians to form a DENTAL LIBRARY ASSOCIATION, similar to the Medical Library Association.

OBJECT.

The fostering of dental libraries and the maintenance of a system for exchange of dental literature and duplicates; securing and distributing the Transactions of dental societies.

ELIGIBLE FOR MEMBERSHIP.

Any dental society, association, university, college, or library having a fixed home and a dental library; any individual interested in dental literature or libraries.

BENEFITS.

The banding together of a united body, with a common cause; the betterment of conditions in dental libraries; a clearing-house through which books, journals, reprints, or lists of these, may be sent from one library to another.

We desire to know what libraries now exist, and how many would be interested in the formation of such a society.

The undersigned may be addressed as Librarian First District Dental Society, at N. Y. Academy of Medicine, 17 W. 43d st., New York City, or as below.

DR. B. W. WEINBERGER,
40 E. 41st st., New York City.

SOCIETY NOTES AND ANNOUNCEMENTS

NOTICES should reach the Office of the DENTAL COSMOS not later than the 11th or 12th of the month preceding that of publication.

Coming Dental Society Meetings.

National.

NATIONAL DENTAL ASSOCIATION. Chicago. August 5th to 9th.

NATIONAL ASSOCIATION OF DENTAL FACULTIES. Chicago. August 2d and 3d.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS. Chicago.

AMERICAN SOCIETY OF ORTHODONTISTS. Chicago. August 1st to 3d.

ASSOCIATION OF MILITARY DENTAL SURGEONS. Chicago.

PSI OMEGA FRATERNITY—NATIONAL ALUMNI CHAPTER. Chicago.

XI PSI PHI FRATERNITY. Chicago.

State Meetings.

APRIL.

ALABAMA STATE DENTAL ASSOCIATION. Montgomery. April 8th.

CONNECTICUT STATE DENTAL ASSOCIATION. New Haven. April 18th to 20th.

CONNECTICUT DENTAL HYGIENISTS' ASSOCIATION. New Haven. April 19th and 20th.

KANSAS STATE DENTAL SOCIETY. Topeka. April 15th to 17th.

MICHIGAN STATE DENTAL SOCIETY. Detroit. April 8th to 13th.

MISSISSIPPI STATE DENTAL ASSOCIATION. Meridian. April 16th to 18th.

MISSOURI STATE DENTAL ASSOCIATION. Columbia. April 1st to 3d.

ODONTOLOGICAL SOCIETY OF WESTERN PENNSYLVANIA. Pittsburgh. April 9th and 10th.

ONTARIO DENTAL SOCIETY. Toronto. April 29th to May 2d.

PENNSYLVANIA STATE DENTAL SOCIETY. Wilkes-Barre. April 23d to 26th.

TEXAS STATE DENTAL SOCIETY. San Antonio. April 10th to 12th.

VIRGINIA STATE DENTAL ASSOCIATION. Roanoke. April 29th to May 1st.

WEST VIRGINIA STATE DENTAL SOCIETY. Huntington. April 10th to 12th.

MAY.

EASTERN ASSOCIATION OF GRADUATES OF THE ANGLE SCHOOL OF ORTHODONTIA. New York City. May 6th and 7th.

ILLINOIS STATE DENTAL ASSOCIATION. Bloomington. May 14th to 17th.

INDIANA STATE DENTAL SOCIETY. Indianapolis. May 21st to 23d.

IOWA STATE DENTAL SOCIETY. Des Moines. May 7th to 9th.

MASSACHUSETTS DENTAL SOCIETY. Boston. May 1st to 3d.

NEBRASKA STATE DENTAL SOCIETY. Lincoln. May 20th to 23d.

JUNE.

COLORADO STATE DENTAL SOCIETY. Estes Park. June 20th to 22d.

FLORIDA STATE DENTAL SOCIETY. Atlantic Beach. June 20th to 22d.

"FOUR STATES" POSTGRADUATE MEETING [ALABAMA, MISSISSIPPI, TEXAS, AND LOUISIANA]. New Orleans. June 3d to 6th.

GEORGIA STATE DENTAL SOCIETY. Atlanta. June 12th to 14th.

KENTUCKY STATE DENTAL ASSOCIATION. Lexington. June 13th to 15th.

MAINE DENTAL SOCIETY. Portland. June 26th to 28th.

NEW YORK STATE DENTAL SOCIETY. Saratoga Springs. June 13th to 15th.

NORTH CAROLINA DENTAL SOCIETY. Wilmington. June 19th to 21st.

NORTHERN OHIO DENTAL ASSOCIATION. Toledo. June 6th to 8th.

SOUTH CAROLINA STATE DENTAL ASSOCIATION. Columbia. June 27th to 29th.

TENNESSEE STATE DENTAL ASSOCIATION. Nashville. June 17th to 19th.

WYOMING STATE DENTAL SOCIETY. Thermopolis. June 10th.

JULY.

California State Dental Association. San Francisco. July 8th to 13th.

Interstate Dental Association. (Col'd.) Buckroe Beach, Va. July 10th to 12th.

New Jersey State Dental Society. Atlantic City. July 17th to 19th.

Examiners' Meetings.

Indiana Board of Examiners. Indianapolis. June 17th to 22d.

Maine Board of Examiners. Augusta. July 1st.

Maryland Board of Examiners. Baltimore. May 30th and 31st.

Michigan Board of Examiners. Ann Arbor. June 17th to 22d.

Mississippi Board of Examiners. Jackson. June 19th.

New Jersey Board of Registration. Trenton. June 24th to 28th.

North Carolina Board of Examiners. Wilmington. June 17th.

Pennsylvania Board of Examiners. Philadelphia and Pittsburgh. June 12th to 15th.

South Carolina Board of Examiners. Columbia. June 24th.

National Association of Dental Faculties.

The next annual meeting of the National Association of Dental Faculties will be held in the Green room of the Congress Hotel, Chicago, Ill., August 2, 1918, at noon. The Executive Committee will meet at 10 a.m. on the 2d. The meeting will continue through August 3d.

Chas. C. Allen, *Sec'y*,
N. W. cor. 10th and Troost, Kansas City, Mo.

American Society of Orthodontists.

The eighteenth annual meeting of the American Society of Orthodontists will be held August 1, 2, and 3, 1918, at the Edgewater Beach Hotel, Chicago, Ill.

This will be an excellent meeting. It is advisable to make your reservations early.

F. M. Casto, *Sec'y*,
Rose Bldg., Cleveland, Ohio.

Baltimore College of Dental Surgery.

Class of 1913.

Will the members of the above class kindly communicate to the president of the class their present address?—that he may write them in reference to class reunion to be held in the near future, *i.e.* May or June; also expressing opinion as to their preference of date.

A. L. Cairns,
1378 Beacon st., Brookline, Mass.
H. W. Doremus,
Orange and Seventh sts., Newark, N. J.

Pennsylvania State Dental Society.

The golden anniversary meeting of the Pennsylvania State Dental Society will be held in Wilkes-Barre, April 23, 24, 25, and 26, 1918. Excellent talent has been secured for the occasion and the program extended to a four days' session. To judge by preliminary reports of committees, this event promises to be the greatest meeting in the history of this organization. All ethical practitioners are cordially invited to attend.

J. F. Biddle, *Sec'y*,
517 Arch st., Pittsburgh, Pa.

Texas State Dental Society.

The thirty-eighth annual convention of the Texas State Dental Society will be held at San Antonio, Texas, the famous City of the Alamo, April 10, 11, and 12, 1918. Members of other state societies are cordially invited to attend.

J. G. Fife, *Sec'y*,
736 Wilson Bldg., Dallas, Texas.

Mississippi State Dental Association.

The forty-third annual meeting of the Mississippi State Dental Association will occur in Meridian, April 16, 17, and 18, 1918, at which time the officers of the society unite with the Meridian members in promising a most instructive and enjoyable meeting.

W. C. Dennis, *Sec'y*,
Jackson, Miss.

Michigan State Dental Society.

The sixty-second annual meeting of the Michigan State Dental Society will be held at the Hotel Statler, Detroit, Mich., the week of April 8 to 13, 1918. The regular meeting will be held on April 8th and 9th, with a splendid program. The remainder of the week will be a postgraduate meeting, in charge of the Detroit Club Clinic, at which every important branch of dentistry will be covered.

C. G. Bates, *Sec'y*,
Durand, Mich.

Odontological Society of Western Pennsylvania.

THE thirty-seventh annual meeting of the Odontological Society of Western Pennsylvania will be held in the Hotel Chatham, Penn ave. and Fourth st., Pittsburgh, Pa., Tuesday and Wednesday, April 9 and 10, 1918.

The Program Committee promises one of the best dental meetings ever held. Men of note will read papers of interest to the twentieth-century dentist.

The clinics will be given by the study clubs of Western Pennsylvania, and will be of interest to all.

Exhibitors will be amply accommodated with space by addressing Dr. Leslie Waddill, Jenkins Arcade Bldg., Pittsburgh, Pa.

KING S. PERRY, *Sec'y*,
719 Jenkins Bldg., Pittsburgh, Pa.

Virginia State Dental Association.

CHANGE OF DATE OF MEETING.

THE Virginia State Dental Association will meet in Roanoke, Va., April 29 and 30, and May 1, 1918.

F. R. TALLEY, *Corr. Sec'y*,
Petersburg, Va.

Connecticut Dental Hygienists' Association.

THE fourth annual convention of the Connecticut Dental Hygienists' Association will be held at the Taft Hotel, New Haven, Friday and Saturday, April 19 and 20, 1918.

On Friday evening a joint meeting of the Connecticut State Dental Association and the Connecticut Dental Hygienists' Association will be held, with Dr. Weston A. Price as the speaker.

Saturday morning interesting papers will be read, and on Saturday afternoon twenty dental hygienists will demonstrate various phases of their work, such as that of the dental clinic in the public schools of Bridgeport, a progressive clinic showing the technique of instrumentation, polishing, brushing, use of mouthwash and dentifrice, a dental hygienist in hospital work, and also a demonstration of the technique in taking radiographs.

All who are interested in mouth hygiene are welcome.

ROSE E. HOUSE, *Sec'y*,
705 Wood ave., Bridgeport, Conn.

Missouri State Dental Association.

THE fifty-third annual meeting of the Missouri State Dental Association will be held at Columbia, Mo., April 1, 2, and 3, 1918. A splendid program is in preparation, and great things may be expected.

J. F. WALLACE, *Sec'y*,
Canton, Mo.

Kansas State Dental Association.

THE annual meeting of the Kansas State Dental Association will be at Topeka, Kans., on April 15, 16, and 17, 1918.

C. K. WEAVER, *Sec'y*,
Clay Center, Kans.

Connecticut State Dental Association.

THE fifty-fourth annual meeting of the Connecticut State Dental Association will be held at the Hotel Taft, New Haven, Conn., April 18, 19, and 20, 1918.

GEO. S. B. LEONARD, *Sec'y*.

Ontario Dental Society.

THE fifty-first annual meeting of the Ontario Dental Society will be held in Toronto, Canada, April 29th to May 2d.

J. P. MACLACHLAN, *Sec'y*,
26 College st., Toronto, Can.

Iowa State Dental Society.

THE fifty-sixth annual meeting of the Iowa State Dental Society will be held in Des Moines, Iowa, May 7, 8, and 9, 1918. An excellent program has been prepared, including seminars, papers, and clinics. A cordial invitation is extended ethical members of the profession from out of the state to attend any or all of these sessions.

E. R. SWANK, *Sec'y*,
Panora, Iowa.

Massachusetts Dental Society.

THE fifty-fourth annual meeting of the Massachusetts Dental Society will be held in Boston, Mass., on Wednesday, Thursday, and Friday, May 1, 2, and 3, 1918, at the Massachusetts Charitable Mechanic Association Building on Huntington ave.

WALDO E. BOARDMAN,
Ch'man Ex. Com.
J. ARTHUR FURBISH, *Sec'y*,
400 Marlboro st., Boston, Mass.

Eastern Association of Graduates of the Angle School.

THE annual meeting of the Eastern Association of Graduates of the Angle School of Orthodontia will be held at the Hotel Vanderbilt, New York City, on Monday and Tuesday, May 6 and 7, 1918.

FREDERIC T. MURLLESS, JR., *President*,
Hartford, Conn.
E. SANTLEY BUTLER, *Sec'y*,
576 Fifth ave., New York City.

Illinois State Dental Society.

THE fifty-fourth annual meeting of the Illinois State Dental Society will be held at Bloomington, Ill., May 14, 15, 16, and 17, 1918.

J. E. HINKINS, *President*,
Chicago, Ill.
J. P. LUTHRINGER, *Sec'y*,
Peoria. Ill.

South Carolina State Dental Association.

THE annual meeting of the South Carolina State Dental Association will be held at the Jefferson Hotel, Columbia, S. C., June 27, 28, and 29, 1918.

W. BUSEY SIMMONS, *President*.
ERNEST C. DYE, *Sec'y*.

Kentucky State Dental Association.

THE next annual meeting of the Kentucky State Dental Association will be held at Lexington, Ky., June 13, 14, and 15, 1918. An "amalgam program" of special interest.

Address all correspondence to

W. M. RANDALL, *Sec'y*,
1035 Second st., Louisville, Ky.

Northwestern University Dental School.

ALUMNI ASSOCIATION CLINIC.

THE Northwestern University Dental School Alumni Association will hold the annual Home-coming Clinic, 31 W. Lake st., Chicago, Ill., on June 10 and 11, 1918. Special features have been provided which will insure a successful and interesting meeting. Make your arrangements now to be in attendance. For information address

M. M. PRINTZ, *Sec'y*,
4235 Lake Park ave., Chicago.

Dental Society of the State of New York.

THE fiftieth anniversary of the Dental Society of the State of New York will be held at Saratoga Springs, N. Y., June 13, 14, and 15, 1918. The society will endeavor to present a literary, clinic, and social program for the benefit of the profession, in keeping with its golden anniversary. A cordial invitation is extended to all members of the National Dental Association. For further information write

A. P. BURKHART, *Sec'y*,
52 Genesee st., Auburn, N. Y.

Northern Ohio Dental Association.

THE annual meeting of the Northern Ohio Dental Association will be held June 6, 7, and 8, 1918, at Toledo, Ohio.

C. H. CLARK, *Sec'y*,
Youngstown, Ohio.

Georgia State Dental Society.

THE semi-centennial meeting of the Georgia State Dental Society will be held in Atlanta, Ga., June 12, 13, and 14, 1918, when this society will celebrate its fiftieth anniversary.

North Carolina Dental Society.

THE North Carolina Dental Society will meet on June 19 to 21, 1918. Headquarters, Oceanic Hotel, Wilmington, N. C.

W. T. MARTIN, *Sec'y*.

Tennessee State Dental Association.

THE fifty-first annual meeting of the Tennessee State Dental Association will be held in Nashville, Tenn., June 17, 18, and 19, 1918.

GEO. L. POWERS, *Sec'y*,
Paris, Tenn.

Florida State Dental Society.

THE Florida State Dental Society will hold its next annual meeting at the Atlantic Beach Hotel, Atlantic Beach, Fla., on June 20, 21, and 22, 1918, where fishing, golfing, and surf bathing is unsurpassed.

A fine program is being planned. All ethical practitioners of this and other states invited.

For further particulars address

D. D. CREWS, *Sec'y*,
Fort Myers, Fla.

Postgraduate Dental Meeting:

Alabama—Mississippi—Texas—Louisiana.

BECAUSE of the great success of last year's "Four States Postgraduate Dental Meeting" from an educational standpoint, the president of the Louisiana State Dental Society called a special meeting to elect a committee to make arrangements for another postgraduate meeting this year. Committee elected follows:

General Chairman—J. J. Sarrazin, 424 Godchaux Bldg., New Orleans, chairman Committee on Interstate Relations.

General Secretary—Leo C. Dempsey, 943 Jackson ave., New Orleans.

S. H. McAfee, 1237 Maison Blanche, New Orleans, chairman Scientific Program Committee.

J. P. Wahl, 1135 Maison Blanche, New Orleans, Editor *Bulletin* and chairman Publicity Committee.

O. L. Loeffel, 727 Maison Blanche, New Orleans, chairman Committee Arrangements and Hotel Rates.

C. S. Tuller, 729 Maison Blanche, New Orleans, chairman Committee on Exhibits.

J. A. Gorman, 629 Maison Blanche, New Orleans, chairman Committee on Clinics.

C. V. Vignes, 709 Macheca Bldg., New Orleans, chairman Committee on Credentials and Registration.

E. B. Ducasse, 735 Maison Blanche, New Orleans, chairman Floor Committee.

A. L. Ducasse, 735 Maison Blanche, New Orleans, chairman Committee on Special Courses.

REGULATIONS.

(1) *Place of meeting.* New Orleans, at the Grunewald Hotel.

(2) *Date.* To avoid interfering with dental college exercises and dental examining board meetings, and to be assured of pleasant weather, June 3, 4, 5, and 6 was selected.

(3) In order to give each member an equal opportunity to get all that is possible and not congest the meeting, the membership will be limited to 350 members.

(4) Membership cards will be issued only to members in good standing in their state dental societies, and to dentists in the army and navy dental corps.

(5) The registration books will be closed May 27th (one week before the meeting) to all except members of the army and navy dental corps.

(6) *Fee.* Owing to increased cost of postage and stationery and all other expenses, the membership fee to the general meeting will be ten dollars for each member. Special courses following the general meeting, fifteen dollars for each course per member.

(7) No one will be issued a special course card unless he has registered for the general meeting.

The subjects chosen to be taught at the next meeting will be as follows:

"Nerve Blocking." Dr. Arthur E. Smith, Chicago.

"Technique of Root-canal Preparation, Treatment, and Filling." Dr. Elmer S. Best, Minneapolis.

"Full Upper and Lower Dentures." Dr. Rupert E. Hall, Chicago.

"Exodontia." (Instructor to be selected.)

Ask yourself the question, Can I afford to miss this meeting? Send your application for membership to the Four States Postgraduate meeting, with your check for ten dollars, to your state chairman for indorsement and transmission by him to Dr. L. C. Dempsey, the general secretary. Members of the Louisiana State Dental Society can apply direct to Dr. Dempsey with membership fee inclosed.

Special Committee for Alabama: Chas. F. Chandler, chairman, 701 First National Bank Bldg., Montgomery; F. F. Perry, secretary, 502 First National Bank Bldg., Montgomery; J. A. Blue, treasurer, 502 Brown-Marx Bldg., Birmingham; Olin Kirkland, 913 Bell Bldg., Montgomery; C. B. Fowlkes, 812 City Bank Bldg., Mobile; W. F. McDaniels, Athens.

Special Committee for Texas: E. W. Smith, chairman, Dallas; Tom F. Coyle, Orange; P. C. Krupp, 905 Union National Bank Bldg., Houston; M. J. Bisco, American National Bank Bldg., Fort Worth; B. F. Thielen, 301 Scott Bldg., Paris, Texas.

Special Committee for Mississippi: M. B. Varnado, chairman, Osyka; W. C. Dennis, Jackson; C. B. Baker, Amory; A. B. Kelly, Yazoo City; J. N. Moffat, Shelby.

J. P. WAHL, *Ch'man Publicity Com.*

California State Dental Association.

THE California State Dental Association will hold its regular annual session for the year 1918 in San Francisco, July 8 to 13, 1918.

We will conduct our meeting this year on the Oklahoma plan, and feel that we can assure all who attend a pleasant as well as a profitable meeting. Further information may be obtained by addressing

JOHN E. GURLEY, *Sec'y,*
350 Post st., San Francisco.

Maine Dental Society.

THE fifty-third anniversary meeting of the Maine Dental Society will be held in the City-hall, Portland, Me., June 26 to 28, 1918.

I. E. PENDLETON, *Sec'y*,
Lewiston, Me.

New Jersey State Dental Society.

THE forty-eighth annual convention of the New Jersey State Dental Society will be held on July 17, 18, and 19, 1918, on Young's Million Dollar Pier, Atlantic City, N. J.

The entire convention will be held on the pier. Machinery Hall will be used for the exhibits. Those who attended last year will remember the magnificent display of dental goods, and Dr. S. I. Callahan of Woodstown, N. J., chairman of the Exhibit Committee, with 25,000 square feet of space, has promised an exhibit greater than that of 1917.

The Essay Committee under the direction of Dr. C. M. F. Egel of Westfield, will present two or three essayists of prominence —names and subjects to be announced.

All meetings for the presentation of papers as well as the business meetings will be held in the Greek Temple, out on the pier.

The headquarters of the society will be at the pier entrance. Mail may be directed to exhibitors, clinicians, or members in care of the Secretary New Jersey State Dental Society, Young's Million Dollar Pier.

A list of hotels where special rates may be secured will be published in the *New Jersey Dental Journal* prior to the convention, or may be secured by addressing the secretary.

A cordial invitation is extended to ethical practitioners.

JOHN C. FORSYTH, *Sec'y*,
430 E. State st., Trenton, N. J.

New Jersey Board of Registration.

THE State Board of Registration and Examination in Dentistry of New Jersey will hold their annual meeting and examination in the Assembly chamber, at the State-house, Trenton, N. J., on June 24, 25, 26, 27, and 28, 1918. License fee $25, re-examination $10.

Applications must be filed complete ten days before the date of the examinations. Address all communications for further particulars to

JOHN C. FORSYTH. *Sec'y*,
430 E. State st., Trenton, N. J.

Maryland Board of Examiners.

THE Maryland State Board of Dental Examiners will meet for examination of candidates for certificates in Baltimore, on May 30 and 31, 1918, at the Dental Department of the University of Maryland at 9 A.M.

For application blanks or further information apply to

F. F. DREW, *Sec'y*,
701 N. Howard st., Baltimore, Md.

Indiana Board of Examiners.

THE next meeting of the Indiana State Board of Dental Examiners will be held at the State-house, Indianapolis, June 17th to 22d inclusive. Applications and other information may be obtained by addressing

H. C. MCKITTRICK, *Sec'y*,
Indianapolis, Ind.

Pennsylvania Board of Examiners.

THE next examination of the Pennsylvania Board of Dental Examiners will be held in Philadelphia and Pittsburgh on Wednesday, Thursday, Friday, and Saturday, June 12th 13, 14, and 15, 1918.

The examination in practical work will be in the Evans Dental Institute, 40th and Spruce sts., Philadelphia, and the University of Pittsburgh, Pittsburgh, on Wednesday, June 12th. The examination in operative work will be held at 8.30 A.M. and the prosthetic work at 1.30 P.M. Applicants are required to furnish all instruments and a patient for the operative work.

The theoretical examination will be held in Musical Fund Hall, Philadelphia, and College of Pharmacy, Pride and Bluff sts., Pittsburgh, beginning at 9 A.M. on Thursday June 13th.

Application papers can be secured from the department of Public Instruction, Harrisburg.

ALEXANDER H. REYNOLDS, *Sec'y*,
4630 Chester ave., Philadelphia.

Michigan Board of Examiners.

THE next meeting of the Michigan State Board of Dental Examiners will be held at the Dental College, University of Michigan, Ann Arbor, Michigan, June 17 to 22 inclusive. Applications and other information may be obtained by addressing

B. S. SUTHERLAND, *Sec'y*,
Owosso, Mich.

North Carolina Board of Examiners.

THE next meeting of the North Carolina State Board of Dental Examiners will be held at Wrightsville Beach, Wilmington, N. C., beginning promptly at 9 o'clock on Monday morning, June 17, 1918. For further information and application blanks address

F. L. HUNT, *Sec'y*,
Asheville, N. C.

South Carolina Board of Examiners.

THE annual meeting of the South Carolina Board of Dental Examiners will be held at The Jefferson, Columbia, S. C., beginning promptly at 9 o'clock, Monday morning, June 24, 1918.

All applications must be in the hands of the secretary by June 14th. Application blanks and full information may be obtained by addressing

R. L. SPENCER, *Sec'y*,
Bennettsville, S. C.

Mississippi Board of Examiners.

THE Mississippi Board of Dental Examiners will hold its next annual meeting at the State Capitol building in Jackson, on the third Tuesday in June 1918, at 8 A.M. Fee for examination $10. Diploma from recognized school and certificate of moral character required. No reciprocity or interchange. For further information, address

B. J. MARSHALL, *Sec'y*,
Marks, Miss.

Maine Board of Examiners.

THE Maine Board of Dental Examiners will hold their regular examination, beginning July 1, 1918, at 8.30 A.M., at the State-house.

All applications and fees, $20, must be in the hands of the secretary by June 21, 1918.

The examination for DENTAL HYGIENISTS will be given at the same time; fee $10.

WILL S. PAYSON, *Sec'y*,
Castine, Maine.

UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING FEBRUARY 1918.

February 5.

No. 1,255,541, to SIGMUND M. LAUTER. Casting machine for dental work.

No. 120,463, to J. B. WILLIAMS CO. Trademark for preparations for cleaning the teeth.

February 12.

No. 1,256,377, to PAUL SALLES. Dental slab holder.

No. 1,256,481, to MALCOLM F. EWEN. Apparatus for administering anesthetics or analgesics.

February 19.

No. 1,256,589, to NATHAN OPOTOW. Dentist's flask.

No. 1,257,120, to EDWIN N. RICH AND WM. E. GROFF. Process and apparatus for making tooth backings.

No. 120,596, to CONVERSE W. LLOYD. Trademark for toothbrushes.

February 26.

No. 1,257,367, to GEORGE HENRY LELAND. Process of making gold crowns.

No. 1,257,741, to PERCY RUSSELL AND ADOLPH W. SCHRAMM. Pressure regulator.

No. 1,257,860, to DONLEY C. HENNEN. Sanitary toothbrush holder.

No. 1,257,864, to HARRY C. HOCHSTADTER. Dental floss holder.

No. 1,257,883, to HENRY H. KONE. Rotary toothbrush.

No. 1,257,936, to PERCY RUSSELL. Dental cabinet.

No. 1,257,947, to GEORGE STERNBERG. Impression cup and matrix.

DR. ISAAC HOWARD DAVIS.

THE

DENTAL COSMOS

VOL. LX. MAY 1918. No. 5

ORIGINAL COMMUNICATIONS

The Technique of Root Amputation.

By HERMANN PRINZ, D.D.S., M.D., Philadelphia, Pa.

From the Research Laboratories of the Evans Institute, Univ. Pennsylvania.

INTRODUCTION.

BY root amputation, root resection, or the more fanciful terms maxillotomy or apicoectomy, we understand the removal of more or less of the diseased root-end of a tooth and the involved periapical tissue by a surgical operation. This operation is by no means of recent origin. As early as 1871, J. S. Smith suggested it, and in 1880 Farrar described a detailed method of its application. Rhein, in 1890 and again in 1897, furnished suitable instructions regarding its technique, while Lodge in 1897 formulated the indications for its application. A systematic description of a satisfactory working method which has given most excellent results must be credited to Partsch. In 1896 and in subsequent publications he presented his operative procedures to the profession, and since then this method has been accepted as the operation of choice. During the last decade the literature on the subject has grown very voluminous, and merely to recall a few of the more important contributors we enumerate the names of Blum, Dunn, Federspiel, Gilmer, Ivy, Lederer, Levy, Mayrhofer, McMillan, Naumann, Riesenfeld, Sausser, Schamberg, Thoma, Weiser, Williger, and others too numerous to mention.

INDICATIONS FOR THE OPERATION OF ROOT AMPUTATION.

It is quite impossible to specify an absolute indication for the operation of root amputation which holds good in every case. The correct diagnosis of the prevailing conditions in each individual case is the only definite indicator for the future therapeutic (surgical or medicinal) procedure. In general terms it may be stated that the following pathologic conditions—which, incidentally, constitute the so widely discussed vicious circle generically known at present as oral focal infection—render the operation of root resection justifiable: (1) Chronic alveolar abscesses, with or without fis-

tulas, which have defied medicinal treatment; (2) granulomas (chronic proliferating pericementitis); (3) radicular cysts; (4) deep fractures of roots; (5) hyperplasia of cementum (exostosis); (6) foreign bodies in root-canals, *i.e.* broken instruments, etc.

An imperative necessity for a correct diagnosis is a roentgenogram of the involved region. It should be understood, however, that the roentgen picture is primarily only an aid to the diagnosis; the basic principle of the latter involves a physical examination in all its aspects.

Regarding the suitability of the individual teeth for this operation, it may be stated that all the teeth with the exception of the third molars are amenable to it. Naturally, the single-rooted teeth offer the least difficulties; in multi-rooted teeth the operation is frequently materially simplified by excising the entire involved root.

Concerning the pathologic anatomy of the above enumerated classification, it may be not amiss to rehearse the more important facts involved in the various tissue changes. Acute apical pericementitis caused by infection, unless checked in time, results in a purulent osteitis, commonly referred to as alveolar abscess, while the chronic type, *i.e.* chronic proliferating pericementitis, manifests itself in the formation of an inflammatory fungoid new-growth, simple or epithelial granuloma. The dense wall of granulation tissue, in the past incorrectly referred to as the abscess sac or the pyogenic membrane, is intended by nature to protect the surrounding structures against infection from the root-canal. If the infection gets the upper hand, a subacute abscess is the sequence. The walls of the granuloma contain leucocytes, lymphocytes, plasma cells, droplets of fat, and a very rich blood supply. Infection of the granuloma usually is present only in about 30 per cent. of the cases; it may become infected at any time, however, as a sequence of renewed activity of the infected root-canal.

The epithelial granuloma is the most frequent type. Scattered in its wall are found the rests of the paradental epithelial débris of Malassez, *i.e.* epithelial remnants of the embryonic dental groove or ridge. As a sequence of chronic irritation, principally from toxins, the epithelial rests begin to sprout and to grow until a complete sac is formed. At this moment the cyst is born, as it were.

Cysts may be defined as being sharply circumscribed collections of fluid confined to a cavity which has no channel of outflow. The cavity is lined with epithelium or endothelium. The dental cysts about the jaws, according to Magitot's classification, are divided into dentigerous and radicular cysts. It is only the latter type which interests us at this moment.

The growth of the cyst is unlimited; it is partially brought about by the increasing pressure of the accumulated fluid secreted by the epithelial lining, and partially, as Williger states, from mucoid degeneration of the connective tissue bundles encapsulated in the epithelial débris. The contents of the cyst consist of a more or less thick, viscid, glairy fluid, frequently containing crystals of cholesterin and occasionally calcareous deposits. At times the cystic fluid becomes infected and tinged with blood.

In a recent book on "Oral Abscesses," Thoma states that "The author agrees that cysts may be formed in both jaws from such conditions [granulomas], but this must happen extremely seldom, or we would meet with cysts more commonly in these days when granulomata are found in almost everybody's mouth." And in a discussion on this subject before a society meeting the essayist stated that a professor of dental pathology assured him he had never seen a dental cyst. These statements are contrary to our experiences in the infirmary of the Evans Institute. During the period of five months (October 1917 to February 1918) Dr. Wade, our radiographer, reports fifteen cysts, and we operated during that same period on twelve cyst cases. It is inconceivable to assume that cysts should be more prevalent in Philadelphia than in other parts of the United States.

INSTRUMENTARIUM.

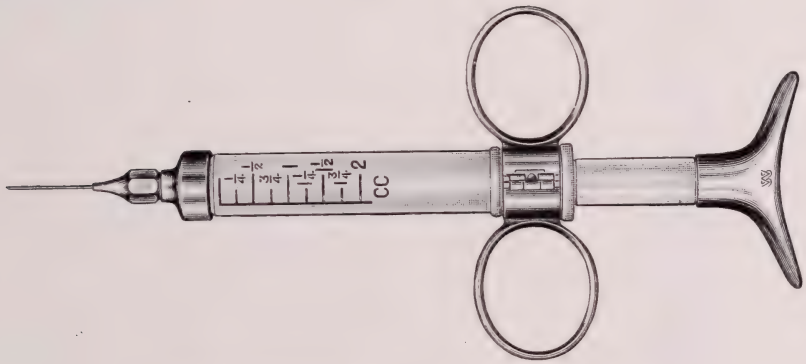
The selection of the proper instruments necessary to carry out the operation of root resection most speedily and with an assurance of safety is largely a matter of personal equation. The instruments advocated by the writer are selected on account of their combined simplicity and usefulness. They have been tested out sufficiently to warrant their recommendation. They are—

(1) Dental hypodermic syringe and suitable needles.
(2) Twisted flexible aluminum applicator.
(3) Cheek retractor.
(4) Flap knife combined with periosteal elevator.
(5) Small retractor with four sharp prongs.
(6) Dental burs.
(7) Curets.
(8) Gauze-packer.

Other necessary instruments, as pliers, water-syringe, powder-blower, etc., are usually included in the dental equipment, and do not need to be specially mentioned. The choice of a hypodermic syringe especially adapted to the needs of the dental surgeon is pre-eminently of the highest importance. All-glass syringes, glass-barrel syringes, and all-metal syringes are the usual types found in the depots.

An all-glass syringe (Fig. 1) that answers every reasonable demand of asepsis, durability, and perfect construction has been suggested by the writer, and is giving universal satisfaction. The syringe is constructed after the well-known Luer pattern, holding 2 cc., and marked with suitable divisions on the barrel. The piston and the barrel are ground so perfectly that no washers are required to make watertight joints. An adjustable finger-rest is easily slipped over the assembled parts, and assists greatly in adjusting the needle-opening in any desired direction and in exerting pressure on the piston. The piston-rod, made of solid glass, is sufficiently long to allow about two inches of space between the finger-rest and the piston-top. The space is of importance, as it allows the last drop of fluid to be expelled under comparatively heavy pressure without tiring the fingers. A removable cane-handle, made of metal, greatly facilitates the exertion of pressure on the piston. The needle-adapter carries a universal thread so as to accommodate the hub of any ordinary hypodermic needle. The various parts of the syringe may be detached in a few moments to allow sterilization by boiling; broken parts may be replaced without obtaining a complete new syringe.

Fig. 1.



Aseptic all-glass dental hypodermic syringe.

A small, strong flap knife (Fig. 2), combined with a periosteal elevator especially suitable for oral surgical work, has been recently devised by the writer. The

handle carries a short, stout, and very sharp blade, while its rear end is suitably

Fig. 2.

"Stellite" combination knife and periosteal elevator.

flattened and bent to be used as a periosteal elevator. The instrument is solidly forged out of an alloy known as "stellite." The manufacturers of this metal claim that "stellite is a newly-discovered alloy of cobalt, chromium, and semi-rare metals. It resists oxidation better than any known metal except gold and platinum." This alloy is extremely hard, possessing practically no artificial temper, and the knife made from it may be readily sterilized in an open flame without the least injury. Ordinary fluids, such as weak acids, formaldehyd, and other antiseptic solutions, as well as boiling water, have apparently no influence upon this metal. The edge of the knife may be readily sharpened on an Arkansas oilstone.

Daily use of this knife in subjecting it to the routine wear and tear of an extensive infirmary practice for the last two months has proved its superiority over the ordinary steel knife. The objection which has been raised to a double-ended instrument of becoming infected in handling is readily nullified by the most important property possessed by this alloy, namely, that it may be quickly re-sterilized in an open flame.

A twisted aluminum applicator is essential for the insertion of the nasal anesthetic tampon, and a cheek retractor (Fig. 3) is useful for the purpose of distending the corners of the mouth and elevating the lips.

A small Volkmann or Murphy retractor with four sharp prongs (Fig. 4), intended to securely keep the flap in place during the operation, is indispensable. Those provided with a ring end to prevent tiring of the fingers while holding it are to be preferred. A slight bend of its shank as suggested by Williger protects the lips from undue pressure. Some operators advocate the Killian head-band for holding the retractor, or the use of a double-ended Weitlander's self-retaining retractor, but the writer has had no experience with these accessories.

Dental burs especially suitable for this operation are round and bud burs No. 20 gage (Fig. 5), the largest pointed fissure burs. and a few small round burs. For cutting green bone the pointed plain fissure burs are recommended, while for

resecting the root-end, cross-cut tapered fissure burs, used with a saw motion, are to be preferred. To facilitate their working quality the burs should be dipped in borated vaselin (1:10). Some operators advocate the use of large hand burs, and others insist upon employing a variety of chisels and the mallet or hand gouges for this operation. All of these instruments are expensive, require great physical force, and an undue expenditure of time. The chisel and mallet are uncalled-for in this operation; the mallet blow is always painfully felt by the patient. The writer has seen several cases where the tooth operated upon was lost shortly after its apex had been chiseled off. He is of the opinion that every dental practitioner is capable of performing this operation. The general practitioner is certainly most proficient in using that utilitarian instrument, the dental engine, and there is no valid reason why he should not use it for this purpose. The keynote of this essay is simplicity of technique in a supposedly complicated operation by the elimination of all unnecessary paraphernalia.

Fig. 3.

Cheek retractor.

Fig. 4.

Small sharp-pronged retractor.

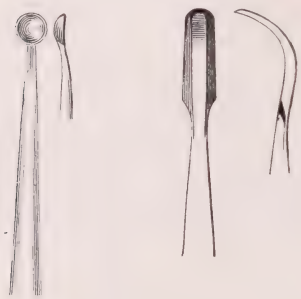
Fig. 5.

Round and bud burs. No. 20 gage.

A few simple curets for the removal of the diseased tissue from the bone cavity are most essential. Special surgical curets are not necessary. A suitable selection is made by employing scalers No. 8 or 9 and plastic instrument No. 41

(S. S. W. catalog), the latter virtually being a very large spoon excavator. (Fig. 6.) These instruments should be keenly sharpened with emery-paper disks, etc. Finally a gauze packer is to be recommended. The packer, as suggested by Luniatschek, may be readily made from a discarded gold plugger by drawing its temper, flattening out its upper end, and cutting a V-shape groove in this end so as to obtain two sharp prongs for engaging the gauze while packing the cavity. A slight curve at its sharpened end improves its usefulness.

Fig. 6.



Spoon and hook-shaped dental curets.

OPERATIVE PROCEDURES.

The patient is prepared for the operation by being covered with a rubber apron, and by protecting the head and the upper part of the body with a baby-crib sheet fastened with towel clips. Only the lower part of the face is exposed. Usually the teeth are closed together, and the floor of the mouth and its vestibule are loosely packed with cotton to absorb blood, etc.

In all cases of root resection we invariably insist that the root-canal of the involved tooth must be suitably treated and filled prior to the operation. Only in cases when operating for the removal of broken instruments do we defer the filling until after the operation, and in such a case for the reason that it may be necessary to push the obstructing agent back into the canal. As a root-filling for this specific purpose we prefer lining the canal with a thin, zinc chlorid cement followed by a gutta-percha cone. It has frequently happened that during the process of cutting off the root-end the gutta-percha cone became entangled in the revolving bur when chloro-percha had been used.

ANESTHESIA.

The absolute *sine qua non* of a successful root amputation is the perfect local anesthetization of the parts involved. It is impossible at this moment to enter into a discussion of the various methods employed. Our clinical experience teaches us that a combination of conduction anesthesia combined with slight local infiltration undoubtedly gives the best results. The author insists that the operation must be performed with as little pain as possible. Any reasonable method or combination of methods which accomplishes the desired result is therefore suitable for this purpose. If the correct technique of injection is carried out *lege artis* the patient experiences practically no discomfort.

In operating on the upper incisors and canines the application of a good-sized nasal tampon saturated with a 20 per cent. novocain solution in distilled water and introduced by means of a twisted aluminum applicator is essential to paralyze those nerve filaments which are not reached by the injection into the infra-orbital and the incisive foramina. As a local anesthetic we use only a boiled, sterile, isotonic salt solution containing $1\frac{1}{2}$ per cent. novocain. Five cc. of this solution are mixed with three drops of epinephrin (adrenalin) solution at the time when we are ready to inject. The site of the injection is painted with a mixture of tincture of iodin 2 drams, and acetone, c. p., 4 drams, which immediately dries the tissues and leaves a sterile field for inserting the needle. The quantity of the anesthetic solution used necessarily varies with the nature of the operation. Ordinarily from 2 to 3 cc. are required for a single tooth.

The length of time necessary to intervene between the injection and the first incision varies. Usually ten minutes are allowed for ordinary nerve blocking, and at least fifteen minutes for a mandibular injection. Many operators are inclined to begin the operation too soon, and as a consequence much unnecessary discomfort is experienced by the patient. The anesthetic and the anesthetist are frequently the recipients of uncalled-for blame which, in reality, should be borne by the operator. On an average, the anesthesia lasts from forty-five minutes to an hour.

CHARACTER OF INCISION.

The most approved incision for root amputation is the semicircular cut as introduced by Partsch (Fig. 7). It allows

Fig. 7.

Patient prepared for operation. The line on the gum surface over the region of the lateral incisor indicates the direction and size of the incision.

the retraction of the formed flap without undue stretching of the adjacent parts. In both jaws, the apex of the incision points toward the teeth. The diameter of the incision should be sufficiently long—about one inch—to allow the elevation of a good-sized flap. The cut should be so gaged that its apex is about three-eighths of an inch or more if possible from the gingival edge, otherwise necrosis of the thin band of gum tissue as a sequence of prolonged interruption of nutrition from the action of adrenalin is sure to follow.

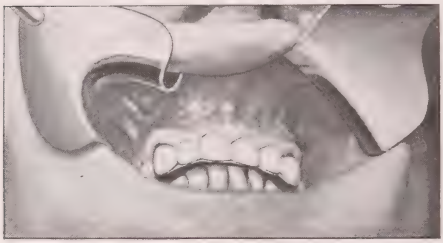
The frenum of the lip in either jaw should never be cut, otherwise a most unsightly deformity will often result. The cut should engage the mucosa, the gum-tissue, and the periosteum; an existing fistula is best engaged within the flap. With the periosteal elevator the gum tissue is lifted up and the bone is exposed. Old cicatricial tissue often causes difficulties in loosening the flap from its bony adhesions. The sharp-pointed retractor is now inserted, and if the bone is not perforated, which, however, is frequently the case on account of former abscesses, the alveolar plate is perforated with a medium-sized round bur on either side of the root to allow a large fissure bur to enter. With the latter bur a good-sized, oval-shaped window is cut so as to expose the affected root. The root-end, which is usually found to be more or less eroded, is now cut off, removed, and the edges of the root stump trimmed. The opening into the bone is enlarged with the largest bud bur (No. 20 gage) until every vestige of necrosed bone is removed, and the periapical space is scraped with the hook and spoon curets until a clean, bony cavity is obtained. Sponging with cotton or gauze tampons is frequently necessary to obtain a clear field. To facilitate close inspection, artificial light is most serviceable. In the absence of some special illuminating device a small "spot-light" can be recommended. With a large round bur (No. 20 gage) the cavity is now enlarged, and every remnant of diseased structure is removed. After sponging the cavity with a tampon dipped in warm physiologic salt solution, it should appear as clean as a "billiard ball," and the canal filling of the resected root-end must be clearly visible.

The essential point of the operation is not so much the cutting off of the root-end, as we hear it so frequently emphasized, but the painstaking curettage of

the fungoid mass from the bony cavity. The retractor is removed, the cavity is painted with the iodin-acetone mixture, and with a powder-blower a thin coating of some surgical dusting powder is blown into it. A suitable surgical powder for this purpose consists of thymol-iodid (aristol), 1 dram; boric acid, 4 drams. The flap is pressed to place and covered with a strip of sterile gauze dipped in salt solution. We never sew the flap in place.

There was a time when we religiously sewed every flap, because we were taught to do so. In time, however, we observed that in those cases where we omitted the

Fig. 8.



Mr. J. M. Photograph of case Figs. 17 and 18, one year after operation. Practically no scars are visible.

sewing the healing of the wound took place equally as fast, and with less disturbance than in those cases receiving the customary three stitches. After discontinuing sewing we tried numerous devices for covering the wound, *i.e.* plasters, pastes, wound varnishes, silver foil, etc., because of the fear of infection. In the last 100-odd cases, however, we proceeded as outlined above, merely instructing the patient to place a piece of sterile gauze, with which we provided him, over the cut surface, renewing it after each meal and before bedtime. As a mouthwash we recommend warm salt water. We caution him not to show the wound to any inquiring friends, thereby disturbing the healing edges of the wound. So far we have not seen a single case of post-operative infection. In the average case the incision closes by primary union on the third to the fifth day, and practically no visible scar remains. (Fig. 8.)

In two cases we were forced to pack the wound on account of sluggish tendencies to heal. One of these cases was a highly anemic woman receiving hypodermics of arsenic and iron at the time of operation, and in the other case (the lower incisors) slight sloughing of the soft tissues occurred on account of the incision having been made too close to the gingival line. The rationale of leaving the wound undisturbed by packing is to allow a blood-clot to form in the cavity after the vaso-constrictor effect of the adrenalin has worn off. The clot seals up the cavity effectively, and protects the edges of the wound.

POST-OPERATIVE TREATMENT.

The post-operative care consists in advising the patient to apply the hot-water

Fig. 9.

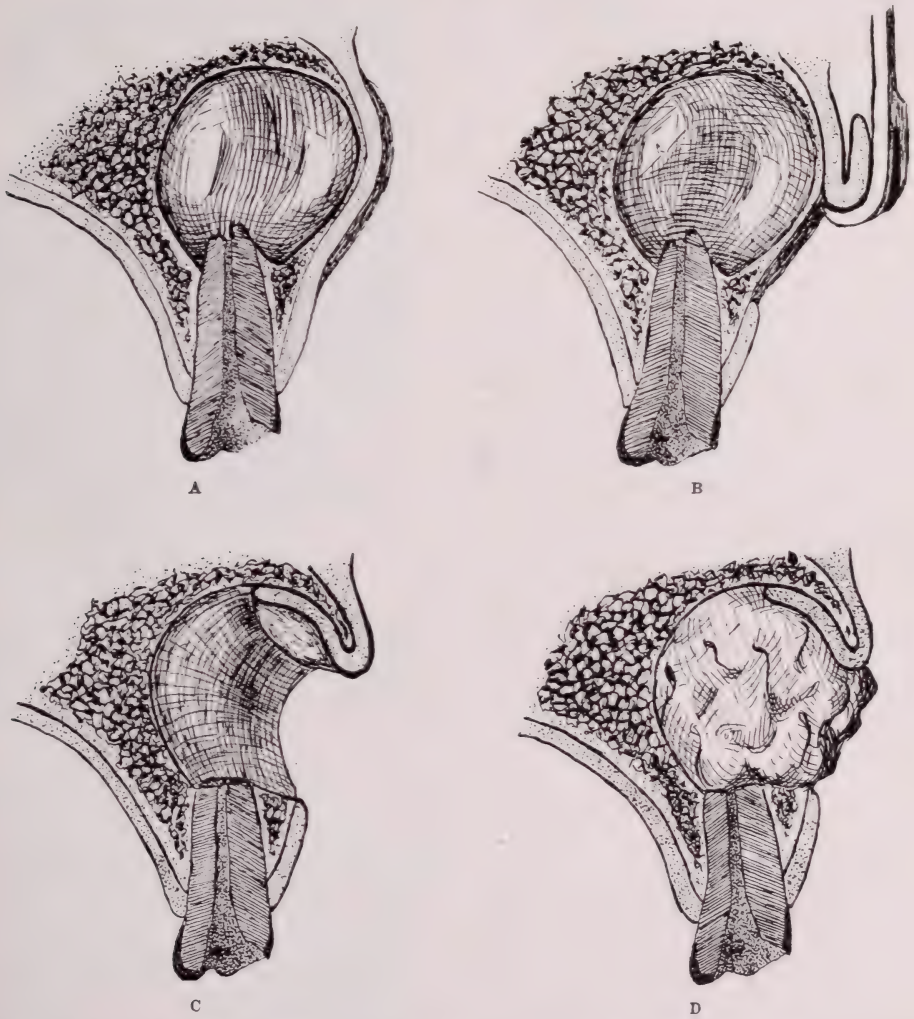
Small dental trephines.

bottle about twice a day for one-half hour over the operated side of the face. The patient should be cautioned, however, not to do this until two or three hours after the operation, *i.e.* until normal sensation of the affected parts has returned, otherwise he may severely burn himself, as we have had occasion to observe in one case. If post-operative pain is severe, 10 grains of acetyl-salicylic acid (aspirin) taken with a cup of warm tea or a glass of water usually gives prompt relief. The patient should report the next day for inspection, and again about the fifth day. A slight

touch of iodin-acetone over the region is our routine after-treatment.

As stated above, all teeth except the third molars have been operated upon by us. However, a word of caution is necessary, as occasionally the upper canines, and very frequently the second premolars and the molars lie very close to the maxillary sinus, and consequently the accidental opening of the sinus during root resection may occur. By operating under aseptic precautions as far as they can be carried out in the oral cavity, no fear of infection should be entertained. Washing out of the accidentally opened sinus is contra-indicated.

Fig. 10.



Schematic drawing of cyst operation. A. Radicular cyst. B. Retractor holding the lifted-up flap in place. C, Cyst opened, bag removed, root-end cut off, and flap pressed into cavity. D, Cavity packed with iodoform gauze to keep flap in position.

In approximately thirteen of such accidents no bad after-affects were observed. It is usually followed by bloody discharges from the nose for the ensuing twenty-four hours. Owing to the above enumerated anatomic relations, at rare intervals one is forced to operate within a very limited area about the apical tissues. To avoid complications, the use of small dental trephines (see Fig. 9) in conjunction with medium sized round burs will be found most satisfactory for this purpose.

In operating upon the palatine roots of the upper molars the procedure of root resection is materially simplified by cutting off the entire root slightly above the bifurcation. By making a perpendicular slit in the gum tissue the root is exposed, cut off *in toto,* and pried out with an elevator. The cut surface of the crown end is grooved with an inverted cone bur, and veneered with soft amalgam. The next day the filling, especially the edges, are trimmed and polished. Such teeth are serviceable for many years; the writer has observed a case in which such a tooth has been serviceable for twelve years.

In the lower jaw attention should be paid to the presence of the mental foramen in the region of the apices of the premolars. The lower molars offer difficulties on account of the heavy, bony, external oblique ridge, and also in regard to their close proximity to the mandibular canal. A good X-ray picture is of much assistance in recognizing these possibilities. Removing the root *in toto* in such teeth is preferred to the excision of its apical end. The further procedures are the same as those described for the operation about the palatine roots of the upper molars.

The writer has frequently been asked, How long will it take for the new bone to completely obliterate the cavity? It is somewhat difficult to give a precise answer; as yet he has had no occasion to examine post-mortem specimens. Figs. 18 and 19 show cases operated upon a year ago, and Fig. 17 one operated upon a year and nine months ago, and it is left to the reader to form his own conclusions.

OPERATION FOR RADICULAR CYST.

The operation for radicular cyst depends primarily upon the size of the cyst. Small cysts of about the size of a cherry are treated exactly as granulomas, while larger ones require a somewhat modified procedure. For the latter type,

Fig. 11.

Mrs. Z. Cyst extending practically over the entire hard palate. Opening made over the region of the right lateral, and counter opening over the left lateral.

the classical operation as originally suggested by Dupuytren and by Heath, but later materially simplified by Partsch, is our choice. The basic principle of the Partsch operation involves the transformation of the existing cystic cavity into an accessory cavity of the mouth by the complete extirpation of its anterior wall. The cyst is lined with secreting epithelium (see Fig. 10), which genetically is identical with that of the oral cavity, hence the absolutely sure return of the cyst when the cavity is allowed to close. As stated above, the radicular cyst is always the sequence of a pre-existing epithelial granuloma.

Radicular cysts are much more fre-

quently observed in the upper jaw than in the lower, on account of the difference of the anatomic structure of these bones. The diagnosis of a cyst in its early stages

Fig. 12.

Mr. H. J. Cyst extending over anterior part of the hard palate, operated April 30, 1917.

Fig. 13.

Mrs. Z. Appearance of permanent opening of cyst of Fig. 11, eight months after operation. Left opening closed two weeks after operation.

by physical inspection is very difficult or even quite impossible, while at a later period its size usually leads to its ready recognition. The differential diagnosis between a cyst and a granuloma from an X-ray picture is rather simple to the trained eye. The large dark area having a sharp outline in the negative indicates its presence; in case of any doubt, a trial puncture quickly reveals its true nature. The anterior wall of the cyst is often as thin as paper, hence

Fig. 14.

Impression of present cyst cavity shown in Fig. 13, eight months after operation.

the peculiar parchment-like sound emitted on exerting slight pressure, and known as the pathognomonic sign of Dupuytren. The pressure of the fluid present in a cyst, especially a small one, is often quite pronounced. The operator is cautioned to keep this fact in mind, as otherwise he may accidentally have the cyst contents deposited in his face. Oc-

Fig. 15.

Impression of present cyst cavity shown in Fig 12, eleven months after operation.

casionally these cysts grow very large; their formation and growth is painless, and unless they become infected the only inconvenience to the patient is the interference with speech and deglutition.

In operating upon a large cyst, the preliminary procedures are the same as those outlined above for the operation on granulomas. After lifting up the overlying soft structures the *entire* an-

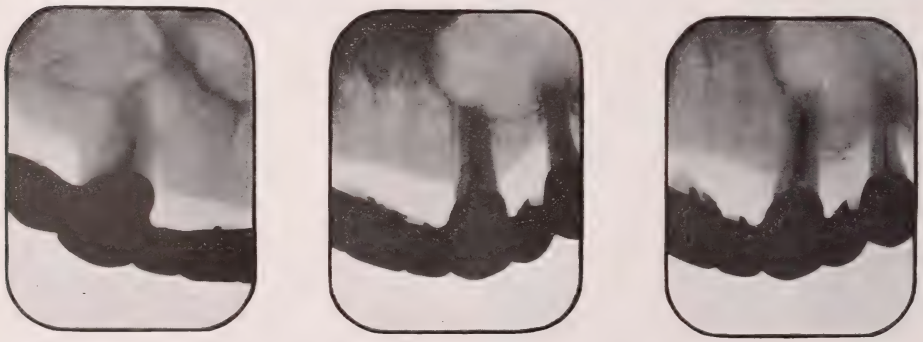
terior bony wall of the cyst must be cut away. After the cyst bag is opened and its contents washed out, and the roots of the teeth projecting into it are cut off, the cavity is lightly curetted, the flap folded into it, and the entire cavity tightly packed with a strip of 5 per cent. iodoform gauze. The packer described above is a most serviceable instrument for this purpose. Extreme care must be observed in curetting the walls of a large cyst. The resorption of bone in the upper jaw may be so complete that the curet will readily pass through the soft tissues into the roof of the mouth, antrum, or nose, and in the lower jaw the mandibular nerve, artery, and vein may lie exposed at the bottom of the cavity. Large cysts of the mandible predispose this bone to pathologic fractures.

Fig. 16.

A B C

Mrs. A. S. A, Left central and lateral incisors before operation. B, Nine months after operation. C, One year and nine months after operation.

Fig. 17.



A B. C

Mr. J. M. A, Upper right canine. Before operation, March 21, 1917. B, Same tooth. Directly after operation, April 18, 1917. C, Same tooth. One year after operation, March 12, 1918.

The packing is removed after twenty-four hours, when the cavity is again lightly plugged, and the gauze tampon is changed about every fourth day until the cavity is completely lined with epithelium

from the ingrowing mucous membrane. The time involved in this continuous packing of the cyst may be materially shortened by using bone-wax. Mayrhofer has introduced a most ingenuous procedure for this purpose, and in the hands of those who master the correct technique the results obtained are very gratifying. In using bone-wax or "bone plombe," as this material is known, the important point to be observed is to have a dry cavity, otherwise the bone-wax will not stick. Our method may be described briefly as follows: The patient, sitting in the dental chair, is placed in such a position that the long axis of the cyst cavity is in a perpendicular direction. The cavity is dried with gauze sponges, painted with iodin-acetone, and then coated with a thin film of sterile paraffin oil. The bone-wax, which has been previously melted by placing the bottle containing it in very hot water, is now poured into the cavity until the latter is completely filled, and allowed to congeal. The surplus amount is wiped off. The patient reports about once a week for inspection. Usually in two or three weeks the wax has to be removed, as it is loosened on account of the moisture secreted by the ingrowing mucous membrane. As soon as the cavity is completely lined with epithelium the patient may be discharged. He is instructed to wash the cavity with warm salt water by means of a soft rubber ulcer-syringe. The rationale of using bone-wax for this purpose consists in completely obliterating the bony cavity with a sterile absorbable plug. The cavity will be filled with new bone tissue from the bottom up. It may take many months before the opening is fairly well obliterated, and more or less of a depression will always remain at the site of the operation. As the operation has been performed within the oral cavity no external deformity is to be noticed.

Fig. 18.

A B C

Mr. J. M. A, Upper left canine. Before operation, March 1917. B, Same tooth, immediately after operation, March 1917. C, Same tooth, one year after operation, March 1918. Resorption of bone about the apex has caused an opening into the antrum.

A suitable bone-wax for the above purpose may be prepared according to this formula:

Bone-wax.

℞—Yellow wax,	4	drams
Cottonseed oil,	14	"
Aristol,	1	dram

Melt the wax and oil in a porcelain capsule on a water-bath; let cool, remelt, and add the aristol. Melt over once or twice until a perfect mixture is obtained.

Regarding statistics of root amputation, it may be stated that the writer has performed this operation about 200 times without a single failure. During 1917 and up to March 1, 1918, he or his as-

sistant, Dr. J. E. Aiguier, operated on 92 cases primarily for granulomas and chronic abscesses; 17 of these cases were cysts. The average time required for an ordinary granuloma operation by employing our present method of technique is less than ten minutes, not including the injection of the anesthetic.

In presenting the technique of root amputation to the general practitioner, the writer, in harmony with the maxim of the great Boerhaave—"Simplicity is the seal of truth"—does not make any pretense of claiming originality for the method involved. He has endeavored to give credit to those who have assisted in the development of this most useful operation for the conservative treatment of those teeth which otherwise would eventually have to be sacrificed to the forceps. Incidentally, this operation offers a rational procedure for the complete elimination of the most serious problem which confronts the practitioner of dentistry and medicine today, namely, oral focal infection. The writer merely reiterates the technique of this operation as it is practiced at present with most gratifying results in the institution with which he is connected, in the conviction that this method once more vindicates the truism of the old medical axiom of Asclepiades: *Curare cito, tute, et jucunde.*

The writer is indebted to Mr. E. G. VanValey for making the plain-line drawings, and to Messrs. A. E. and F. P. Croke and John Menzies for taking the photographs used in illustrating this article.

40TH AND SPRUCE STS.

The Nature of the Orthodontic Problem.

By A. LeROY JOHNSON, D.M.D., Springfield, Mass.

(Read before the union meeting of the Orthodontic Departments of Tufts College and Harvard Dental School, Boston, Mass., March 20, 1918.)

THE term occlusion is relatively new to science. It was coined by the dental profession to convey an idea which had long been a subject of study by zoölogists under the title of the mutual mechanical relations of the teeth of mammals. The studies of the mechanical relations of the teeth, now termed occlusion, the tooth forms, together with the anatomical structure of the jaws and skull in their relation to food habits and function, furnish the basic material upon which the science of orthodontia was founded.

From the evidence of these studies, reinforced with embryological data, a natural law, the law of occlusion, was recognized. There was seen to be, under normal conditions, a constant and ideal relation of phenomena in the growth and development, racial and individual, of the masticatory apparatus. The order of sequence of the phenomena was seen to be so invariable that a definite conception of the normal was realized. If it were possible to follow in detail the evolution of the masticatory apparatus in an individual organism, none would be found that did not vary in some degree from the ideal. The ideal, the normal, embodied in the law of occlusion, is a conception of the normal growth and development of the dental apparatus derived from comparative studies of many organisms, fossil forms, and prehistoric skulls; it is the uniformity seen in the diversity of organic forms. The significance of this should be fully appreciated,

as it is the very essence of scientific orthodontia.

The normal relation of the occlusal inclined planes of the teeth is but a phase of the law of occlusion. Occlusion is a tangible measure of conditions, and normal cusp relation one of the factors essential to the normal function of mastication. The normal growth and development of associated structures is as vital as normal cusp relation, and absolutely essential to it. The occlusion resulting from orthodontic treatment must often be a compromise of the ideal cusp relation, as in cases of missing or malformed teeth, or as the result of the inability to stimulate physiological cell activity in one or more of the supporting structures; in other words, because of factors beyond control the absolute is no more attainable in orthodontia than in other fields of biological science. From the above it is evident that a scientific diagnosis of a condition of malocclusion cannot be made from a plaster model alone, for orthodontia is concerned with occlusion in its relation to the organism as a whole.

As clinical experience and observations have gradually defined the field of orthodontia, the meagerness of our information has become more and more obvious. Although the innate principles and natural tendencies of growth and development conform to the same general laws in the human being as in other forms of life, it has been difficult to apply the conception of the law of occlusion derived from the older general morphology to orthodontic problems. The knowledge available has not been extensive enough to explain away some of the most common difficulties experienced in practice. In fact, it has become quite evident that the difference in the essential character and life-history of the human being from the lower and prehistoric organisms demands a more comprehensive knowledge of the law of occlusion.

Until quite recently animal morphology and physiology, as ordinarily presented, have been purely descriptive sciences. The material for the study of normal histology, anatomy, and paleontology has been of structures complete. Structures have been thought of as fixed in form, remaining the same throughout life. The forms of present-day organs have been attributed almost entirely to heredity, "while the vital activity of the living thing, so clearly shown in development and regeneration, has been ignored or forgotten."[1]

Biological research of recent years has resulted in a transformation of the old ideas of morphology and physiology. They are being brought together on common ground. As experimental data have pointed consistently to the fundamental unity of life phenomena, the truth has become more clear that the only possible justification for dealing with the constituents of an organism as if they were separate entities is in the convenience of study thus afforded. A knowledge of morphology or physiology, taken by itself alone, conveys little information of the process of development; but in the correlation of the different points of view pertaining to these sciences, *i.e.* physicochemical factors, physiological processes, morphological features, ecological correlations and adaptations and psychological events—in such correlation is revealed the vital phenomena of development in its real nature as a process essentially continuous.

We believe that orthodontia is in the main a study of growth and development; that it is a science of form development; that it seeks to know why structures take on the forms they do, and what is the nature of the factors which maintain the forms once they are established. We are concerned not so much with the forms as we are with the factors controlling the forms of the structures of the masticatory apparatus. We know now that knowledge limited to a description of the structure of the teeth and maxillary bones, together with the supporting and surrounding tissues, is not sufficient material on which to base the science of orthodontia—for such description shows merely the visible side of organic life, and leaves unknown the real processes of form development, form conservation, and their causes.

ORTHODONTIA A BIOLOGICAL PROBLEM.

To see nothing more in distinctive types than that each one is harmonious in design, and to be content with the assumption that the forms are due to a pre-established design and guiding force, which directs the working out of the design, will not carry orthodontia far in the field of science. The so-called "art requirements" in treatment was a valuable idea in emphasizing the harmonious character of the whole at the time when a realization of the normal was dawning in orthodontia, but it has little value now, since it conveys no conception of the nature of the factors involved in form development. It might be said that God makes the flowers grow, but who will deny that if something is known of the physico-chemical factors involved better blossoms are produced. If orthodontia is to survive as a science of human conservation it must be studied as a biological problem.

In the study of the individual organism it is logical to distinguish in the life of all parts two periods, in the first of which the part is formed prior to and independent of function, while in the second, differentiation and growth are dependent on functioning.

To W. Roux more than to any one man is due this conception of periods of developments. E. S. Russell,(1) in review of Roux' work, says:

> The first period is one of self-differentiation, in which the parts are formed in anticipation of functioning; and the second period is one of functional development, in which the organs are perfected through functioning, and only through functioning. The first period includes the directly inherited structures, growth and development taking place before they began their specific function. The second period includes the further differentiation and maintenance in their typical form of the parts laid down in the first period, and is brought about by the specific function of the part. This period brings to pass the finer functional harmonies of the organism.

The two periods of development cannot be definitely separated from one another, nor does the transition from one to the other occur at the same time in different parts, and furthermore, in the transition both classes of conditions are effective, *i.e.* function is building on to the already formed.

The structures with which orthodontia is most immediately concerned are the teeth, bone, muscle, vascular, and nervous.

The teeth are one of the purest types of structure of the period designated by Roux as the first. Their form is directly inherited, and it is not known to be influenced in development to any appreciable extent during the normal life activities of the organism. Their form is evolved before they are brought within the influence of the specific function for which they exist, the function of masticating, and is not improved with use, the only change being from mechanical abrasion and disease. They are, in a word, non-functional structures.

Bone is of the second period, and is one of the clearest examples of functional structures. D. W. Thompson,(2) in his recent work entitled "Growth and Form," says:

> In the biological aspect of the case, we must always remember that our bone is not only a living, but a highly plastic structure; the little trabeculæ are constantly being formed and de-formed, demolished and formed anew. Here for once it is safe to say that heredity cannot and need not be invoked to account for the configuration and arrangement of the trabeculæ. If a bone be broken and so repaired that its parts lie somewhat out of their former place, so that the pressure and tension lines have a new distribution, before many weeks are over the trabecular system will be found to have been entirely remodeled, so as to fall in line with the new system of forces. This process of reconstruction extends a long way off from the seat of injury, and so cannot be looked upon as a mere accident of the physiological process of healing and repair. In cases of the transplantation of bone, for example, when a diseased metacarpal is repaired by means of a portion taken from the lower end of the ulnar, with astonishing quickness the plastic capabilities of the bony tissues are so manifested that neither in outward form nor inward structure can the old portion be distinguished from the new. About fifty years ago it was discovered by Herman Meyer (and

afterward shown in greater detail by Julius Wolf and others) that the trabeculæ as seen in a longitudinal section of a long bone were arranged in a very definite and orderly way.

Professor Culmann of Zurich, an engineer, recognized in the arrangement of the trabeculæ the lines of stress, or the direction of tension and compression, the shearing stress being got rid of by the arrangement of the material of the trabeculæ wholly along the pressure lines and tension lines. The same phenomena can be traced in any other bone which carries weight and is liable to flexure. In the os calcis and tibia it is very clear.

It is also true that the longitudinal section of a long bone of a limb which has not been used for a considerable time shows atrophy of the trabecular tissue; it almost entirely disappears.

The alveolar process of the maxillary bones, the supporting structure of the teeth, is trabecular bone, and is governed by the same condition as the trabecular portions of long bones. It is a well-known fact that the alveolar process disappears with the loss of the teeth, and is stimulated in its initial stage of growth and development by the growth of the teeth it is later to support. The pattern of the arrangement of the trabeculæ is not so easily discernible as in the long bones, because of the complexity of the forces involved, but it is as truly a functional structure.

The vascular system, although literally of the transitional period, is more functional than non-functional. Only the very first rudiments are laid down in the first period of automatic, non-functional development. Russell says:

All the subsequent growth and differentiation of the bloodvessels falls into the second period, and is due wholly or in part to the direct functional adaptation to the requirements of the tissues. Thus from the rudiments formed in the first period sprout out the definite vessels in direct adaptation to the food consumption of the tissues they are to supply. The size, direction, and the intimate structure of these vessels are accurately adjusted to the part they play in the economy of the whole; and this adjustment is brought about in virtue of the peculiar properties or reaction capabilities of the different tissues of which the bloodvessels are composed.

Thus the fully formed bloodvessels are not the static structures of normal histology but are functional as bone is functional. Without the stimuli of functional activity they atrophy.

Muscle tissue is also functional. The composition of the muscle fiber out of fibrillæ, and these out of muscle prisms, or again the length and thickness of the muscles, bear evidence of the functional adaptability of these structures.(1)

Nervous structures are functional as muscle and vascular structures are functional, and their physiological character manifest in the law of habit is one of the dominating influences of activity.

The living tissues of the face and jaws are inseparably associated, particularly those of a more functional nature. They are molded together, and act and react upon one another in the constant activity of life; there can be no change in one that is not correlated with changes in the others. They are only separate entities as parts of the whole, and when one loses its composite integrity it dies. Malocclusion of the teeth, then, is probably an expression of maldevelopment of all immediately associated structures. Physiological tooth movement is tooth movement in accordance with developmental changes of all associated tissue, and not merely in the bone surrounding the root of the tooth.

It is evident that the masticatory apparatus is constituted of parts essentially different in character. The teeth are purely non-functional, inherited structures; bone, vascular, muscular, and nervous tissues are both functional and non-functional, *i.e.* as they show functional development of rudimentary structures; and the alveolar process is as purely a functional structure as the teeth are non-functional. This assemblage of structures, varying in developmental nature, is organized in anticipation of a definite function to harmonize them. The teeth are surrounded and supported by tissues whose development depends upon the stimuli of function, while the development of tooth forms, under normal conditions, is not known to be influenced in the least by function; hence, from the

physiological character of the oral tissues, the force to harmonize them is that which will adapt the functional structures to the requirement of the tooth forms, namely, the specific function of mastication.

The growth of the different parts and structures is not uniform in all directions. All manner of structural differences come into play, setting up unequal resistances. The sources of growth are not uniformly distributed; one tissue may show a tendency to increase when another does not; the bones, the intervening cartilages, and the surrounding muscle may all show different rates of increment. Under normal conditions these differences in rates of growth are harmonized by the specific function of mastication. In the absence of this specific function the definite forming influence of this part of the organism is missing, and atypical form, *i.e.* form without typical character, appears.

Phylogeny and ontogeny are not wholly distinct phenomena, but are two aspects of the one general process of organic development. In phylogeny is seen the historic values of the different structures of the masticatory apparatus in the evolution of the race.

THE LAW OF ECONOMY OF GROWTH.

The human face, nose, and jaws in an evolutionary sense are retrogressive. Social machinery, resulting from brain development, has removed to a large degree the definite forming force of the function of mastication, so dominant and vital to existence in the lower animals in securing defense and preparing food. Correlated with the development of the brain is seen a gradual recession of jaw structures. The change in the functional activity of the muscles of mastication, especially the temporals, in relation to the expanding cranium is significant. Furthermore, as the developing brain demands an even larger brain-case, the material for its expansion is drawn from the most closely associated phylogenetic and ontogenetic disused structures. The tissue upon which the expansive power of the cranium depends is the same type of osseous formation as the bones of the face, *i.e.* dermal or secondary; they are of the same phylogenetic origin, and belong to the same meristic group of structures at the end of the cerebro-spinal system. So from the law of economy of growth, by which one structure is sacrificed for another, the dermal bones of the skull utilize in development elements essential to the stability of the bones of the face and jaws. Thus in the struggle for existence of the bones of the cranium and the bones of the face, the latter being the more non-essential, tend to atrophy.

Then, again, associated with the evolution of the brain has been a partial transformation of the function of the oral structures. With the development of spoken language the mouth has become more definitely an organ of expression. The tongue, originally an organ of alimentation, is now also an organ of speech. Dawson([14]) says, "This is perhaps the nearest approach in nature to a transformation from a physiological to a psychological function." And so as the specific function of the masticatory apparatus has been modified in its relative importance in the life activities of the human being, the structural constituents have changed correspondingly. It is a matter of common observation in morphological study that wherever the form of an organ is not essential to the existence of the individual as a whole, variation in form and structure is the natural result. There is a normal instability of organization in such parts. It is a natural condition, and it is this instability which renders these tissues so susceptible to and expressive of fluctuations in the physiological balance of the organism as a whole.

Metchnikoff([10]) unreservedly considers the teeth as disharmonies. He says they are out of harmony with the fundamental needs of the race, but adds later on, "It cannot yet be said that they are useless and harmful." A well-known anthropologist says that one of the greatest problems of the medical science of the future is the disposition of the teeth. He sees them as structures fast becoming disharmonic and injurious possibilities.

Although I have only touched in a very fragmentary way the great place of orthodontic structures in evolution, I hope it is clear that scientific orthodontia cannot ignore the facts of phylogeny.

But the problem of orthodontia cannot be disposed of in so general a way for it is concerned with individual elements in each case. The general method of procedure followed in treatment seldom considers anything more than tooth forms. There is little, if any, effort made to determine, to say nothing of influencing, the etiologic factors of which the malocclusion is expressive. In the majority of cases and in much the same manner appliances are adjusted, and the teeth are pulled and twisted into an occlusion like so many stones, while the phenomena upon which the final retention depends are, with the one exception of cusp relation, absolutely ignored. And we know from the racial and individual history of the human being that cusp relation of the teeth is becoming less and less a controlling factor of development. If it were the dominant force which ordinary methods of treatment attribute it to be, malocclusion would not be so common.

The fact is that ordinary methods of treatment recognize in the mutual mechanical relations of the teeth the only difference between individual cases, and proceed upon the belief that the oral structures of all individuals possess the same possibilities of development.

Our public educational institutions are founded upon the same plan in that the same system of instruction is applied to all children. The individual characteristics and innate tendencies of the individual mind are disregarded. All minds are molded to the same system instead of the system being adapted to the distinctive needs of the individual. Since the majority believe that the object of our public schools is to elevate the average intelligence of the masses, perhaps the present method is the best. But in orthodontia, where the object is the betterment of the individual and the problem one of development, it is as imperative to consider the nature of the organism as it is to consider the environment in which it lives. Thus we come face to face with the central problems of biology—heredity, the interdependence of function and structure, and the fundamental unity of the organism as a whole.

INFLUENCE OF FUNCTION UPON FORM DEVELOPMENT.

The term function as generally used is limited to the expression of the specific activity of the individual organ or part, as the digestive function of the stomach or the secretory function of a gland, but in the study of form development it takes on a more comprehensive meaning. It expresses all of the dynamic processes of the living organism; the complex of chemical reactions; the action, reaction, and interaction of organs and parts in the adjustment of life. Interpreted in these terms, the fundamental unity of function and structure are beyond question.

To maintain as some do that structure is the cause of function, and that the structural organization of the organism arises independently of function, making function possible; or, on the other hand, to hold that function is the cause of structure and that the problem of development is the change which takes place in the functions and habits, is, in either case, a failure to recognize but one phase of organic life. Neither function nor structure is the *cause* of the other; they evolve together, and each modifies and conditions the other. "They are merely different aspects of organization, and are dealt with separately by morphologists and physiologists as a matter of convenience."([6]) Child([8]) says that the dynamic processes do not constitute life in the absence of the colloid substratum, nor is the colloid substratum alive without the dynamic processes. In fact, neither function nor structure is conceivable except in relation to the other; they are interdependent and inseparable, and anything which modifies one, of necessity modifies the other also. To deny either is to dispute an essential element of life.

Although in all probability deformities

are for the most part due to environmental causes, it is quite clear that the factors of development are in the germ, the inherited element, as well as in the environment, in both the intrinsic and extrinsic forces. The directing factors of development are in the main intrinsic, and are in the organization of the germ cells, while the environmental factors, the extrinsic forces, exercise chiefly a stimulating, inhibiting, and modifying influence. We cannot regard specific forms of structure as caused by external influences: "The egg of a fish and that of a polyp develop side by side in the same body of water, under identical conditions, each in its predestined form."([15]) Conklin([6]) says, "The entire organism develops out of the germ and the organism of the germ determines all of the possibilities of development, though the actual realization of any possibility is dependent upon environmental stimuli." Heredity fixes the possibilities of development; it sets bounds which cannot be passed.

The form which structures take on is the result of the interaction between a complex of dynamic changes and the colloid substratum; it is the result of the interaction between function and structure; it is never entirely determined by function or by structure; it is conditioned by each. Nevertheless, it is safe to say that function is the constructive agency in form development, and that the inherited element in the organization determines the possibilities of development. H. F. Osborn,([3]) in his recent work, "The Origin and Evolution of Life," says of the creative power of function—"So far as the creative power of energy is concerned, we are on sure ground; in physics energy controls matter and form; in physiology function controls the organ; in animal mechanics motion controls and in a sense creates the form of muscles and bone. In every instance some kind of energy of work precedes some kind of form, rendering it probable that energy also precedes and controls the evolution of life." Thus whatever form the structural elements of the masticatory apparatus may assume, typical or atypical, it is an expression of the interaction of function and structure; and, furthermore, of especial significance to orthodontia is the influence of the organism as a whole upon the life activities of any of its parts.

The living organism as a whole is a unit. It possesses certain properties characteristic of the organic whole rather than of the sum of the vast number of smaller units of which it is composed. To draw a rough parallel: Just as the properties of water are peculiar to the molecule and cannot be accounted for as the sum total of the properties of the atoms of hydrogen and oxygen, so the properties of the organism are connected with its whole organization, and not simply those of its individual cells or units.

The experimental research of Loeb,([4]) Morgan,([5]) Child,([8]) and others upon growth, development, and particularly regeneration, show that these fundamental phenomena of life involve the organism as a whole. They also show the dominance of the whole over any of its parts, and that interconnection of parts is one of the chief peculiarities of an organism. It is not known at present just what the organizing principle is that controls and molds the growing and developing organs and parts into a harmonious whole, but it is well established that there is an internal perfecting agency. Investigations relative to the effect of the internal secretions of the ductless glands is determining the fact that the organizing force may be found in the circulation of the internal secretions of all tissues. Mathews([12]) says:

> The body is an organic whole, and these so-called organs of internal secretion are not unique, but the bones, muscles, skin, brain, and every part of the body are furnishing internal secretions necessary to the development and proper functioning of all the other organs of the body. Such a scheme to be complete must embrace every organ; only the barest beginning has been made in this study, so important, so necessary for the understanding of development and inheritance. The problems of development and inheritance cannot be solved until these physiological questions are answered.

Other investigators seem to be of much the same opinion. Loeb,([4]) in his "The Organism as a Whole" says, in reference to Mendelian heredity:

> It is not yet proved that the organism is nothing but a mosaic of Mendelian characters, but no writer can be blamed for considering such a possibility. If we assume that the organism is nothing but a mosaic of Mendelian characteristics, it is difficult indeed to understand how they can force themselves into an harmonious whole—even if we make ample allowance for the law of chance and the corresponding wastefulness in the world of the living. But it is doubtful whether this idea of the rôle of Mendelian factors is correct. The facts of experimental embryology strongly indicate the possibility that the cytoplasm of the egg is the future embryo, and that the Mendelian characters only impress the individual characters upon this rough block.

He then gives the evidence, and adds:

> If the egg is already the embryo in the rough, we can imagine the Mendelian factors as giving rise to specific substances which go into the circulation, and start or accelerate different chemical reactions in different parts of the embryo, and thereby call forth the finer details characteristic of the individual.

Castle, in his work on "Genetics and Eugenics,"([7]) in discussing Acquired Character says: "That a mechanism for the transmission of acquired characters from the soma to germ-cells has as yet not been demonstrated, does not of course disprove the existence of such a mechanism. Such phenomena as memory, having its basis in the nervous system, and as the control of development and of behavior through internal secretions, give us grounds for believing that an adequate basis will be found when our knowledge of the organism becomes more complete."

Whatever the future may bring forth relative to the nature of the elements involved in the interaction of organs and parts, experimental medicine and biology seem even now to have gone far enough to proclaim the universality of the interaction principle. The recent investigations of Crile,([11]) Cushing, and Cannon also show clearly the necessity of a complete biologic picture of the organism as a whole when studying any of its parts.

Therefore, in the light of its historic nature, racial and individual, the orthodontist must see in the development of the oral structures a manifestation of the life activities of the organism as a whole. The evidence of science is explicit that the masticatory apparatus is a dependent and living part of a living organism; that it is controlled in its growth and development by the same factors which control the growth and development of the organism as a whole, and that it is expressive of both physical and psychical phenomena.

And since the form of structure is the result of an interaction of forces determined by heredity and environment, the question of etiology is a consideration of the factors which affect the organization of the individual or modify the stimuli of the environment sufficiently to disturb the equilibrium expressed in normal development. Consequently the great problem of orthodontia is to distinguish between these two classes of factors, between nature and nuture, and to control development, so far as it may be possible, through the knowledge thus gained.

It will be difficult, doubtless often impossible, to determine the relative value of environmental and hereditary factors in malocclusion, but until we realize something of the true nature of the forces we profess to control, until we realize that we work not upon dead forms, but upon living things, orthodontia cannot withstand the crucial test of practical utility. Because in treatment we employ mechanical means is no reason why we should forget that we do so to stimulate biological processes.

BIBLIOGRAPHY.

1. E. S. Russell. "Form and Function."

2. D'Arcy W. Thompson. "Growth and Form."

3. H. F. Osborn. "The Origin and Evolution of Life."

4. Jacques Loeb. "The Organism as a Whole."

5. Thomas Hunt Morgan. "Regeneration."

6. Edwin Grant Conklin. "Heredity and Environment in the Development of Man."

7. W. E. Castle. "Genetics and Eugenics."

8. Charles Manning Child. "Individuality in Organisms." "Senescence and Rejuvenescence."

9. Eugene S. Talbot. "Developmental Pathology."

10. Elie Metchnikoff. "The Nature of Man."

11. George W. Crile. "Man—An Adaptive Mechanism."

12. Albert P. Mathews. "Physiological Chemistry."

13. G. Stanley Hall. "Adolescence."

14. Geo. E. Dawson. "Psychic Rudiments and Morality."

15. E. B. Wilson. "The Cell in Development and Inheritance."

---

69 Chestnut st.

Restorations with Jacket Crowns.

By J. F. HOVESTAD, D.M.D., Boston, Mass.,

Lecturer at Harvard Dental School in Crown and Bridge Work: Author of "Principles and Technique of Crowns and Bridges."

INTRODUCTION.

A NOTED writer quotes the following: "It must be forever true, that before the beautiful in art or nature can be expressed, or even appreciated, a sense of the beautiful must be gained and carried in consciousness."

Since Dr. Land first described the jacket crown thirty years have passed, and it is surprising to see how few men have realized the beauty and practical value of this truly "ideal crown." The profession owes Dr. Land a great debt, and I take this opportunity to express my deepest appreciation for this great gift to our profession. I am realizing more and more Dr. Land's desire for beauty and perfection, which is so evident in this beautiful crown. And when I say "beautiful crown," I do not refer only to its esthetic appearance, but also to its manifold advantages and features, which are enabling me and my fellow practitioners to solve some of the great problems that confront our profession in the saving of teeth and pulps.

This crown eliminates to the greatest extent the devitalization of pulps, and in its appearance approaches nearer to nature than any other restoration in the past, or at the present time. Very often it deceives the eye of the skilful dentist. The jacket crown is not only useful for single teeth, but can be successfully used in the following ways: To correct irregularities. To raise the bite. To change the bite. There are various types of jacket crowns, but the type I am using extensively is known as the "all-porcelain jacket crown."

VARIOUS TYPES OF JACKET CROWNS.

(1) A porcelain veneer fused to the labial surface of a platinum *plate* shell, cementing the shell with porcelain to the prepared tooth.

(2) Porcelain built up and fused to a perforated platinum *plate* shell, previously fitted to the prepared tooth, cementing the shell with porcelain to the prepared tooth. (Dr. W. G. Bridge.)

(3) Dr. Land's "overlap." This

crown overlaps the tooth mesially and distally, leaving the lingual portion of the tooth uncovered. The porcelain is baked over a platinum *foil* matrix, and this matrix is removed before cementing the "overlap" crown to place.

(4) The building up and fusing of porcelain over a platinum *foil* matrix, or cap. This platinum matrix can be made by the direct or the indirect method and is removed from the finished porcelain crown before cementing the crown into place. This crown is known as the all-porcelain jacket crown.

THE ALL-PORCELAIN JACKET CROWN.

I shall endeavor to describe and illustrate in this article the construction of this crown, dividing the operation into two parts—*operative* and *ceramic*.

In describing the operative part the operator will be shown the necessary steps for the preparation of the tooth, the impression-taking, and the bite; in the ceramic, the making of the crown will be described, including the making of the die and matrix.

Part I: Operative.

PREPARATION OF THE TOOTH.

When deciding upon a jacket crown, it is absolutely necessary first of all to determine the condition of the pulp and general conditions of the tooth or roots related to its foundation and occlusion, upon which we are to build. (Radiographs of the teeth are most valuable aids.)

First: If one is dealing with a vital tooth, every precaution and care must be taken to produce a good tooth preparation without the least injury to the nerve system of the tooth.

Second: When dealing with a "devitalized tooth," all precautions necessary should be taken to sterilize and fill the roots of the tooth, and in many cases it is necessary to build up portions of the lost tooth or root with a suitable material in order to strengthen and preserve the root and to produce a well-prepared seat for the jacket crown.

The use of local anesthesia (novocain) is of inestimable value to the patient as well as to the operator, in order that the necessary "ideal tooth preparation" may be obtained. The technique of the various injections of novocain has been minutely described in my book, "Principles and Technique of Crowns and Bridges."

VITAL TOOTH PREPARATION.

After the tooth with a vital pulp has been anesthetized, a vertical cut on the mesial and the distal sides of the tooth is made with a thin wet carborundum or rubber and carborundum stone. The cutting should be done from the cutting edge toward the neck of the tooth, producing a shoulder at the neck, as shown

Fig. 1.

in Fig. 1. The cutting is done in this manner on both the mesial and distal surfaces of the tooth.

A little thicker stone, but smaller in diameter, is then used to reduce the palatal and the labial surfaces of the tooth, so as to remove the contour and bulk and produce a shoulder at the neck palatally and labially, as shown in Fig. 2.

The cutting edge or occlusal portion of the tooth is ground down to allow for a suitable thickness of the crown. The tooth now presents a rectangle with four well-defined corners. These four corners can be reduced with a wet concaved carborundum stone (Fig. 3), or with a square-end cross-cut or plain square-end fissure bur. (Fig. 4.)

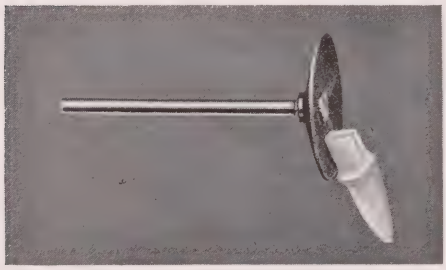
When cutting a tooth with stones for a jacket crown preparation, a steady stream of water should be flowed over tooth and stone from a water syringe.

This is of great value, for the cold (or warm) water dissipates the heat generated, permits more rapid and efficient cutting, and surprisingly reduces the pain from grinding vital teeth. (These syringes are called "hydro-tractors.")

Fig. 2.

The cutting with the fissure burs should be done from the shoulder at the palatal side toward the mesial, from the mesial toward the labial, from the labial toward the distal, and from the distal toward the palatal surface. This is necessary to avoid vibration and facilitate steady cutting. It is very important to cut with these square-end fissure burs in a semicircular direction.

Fig. 3.



A plain square-end fissure bur is now used, with an upward pressure (that is toward the root), to deepen the shoulder. (Miller.) (Fig. 4.) This is followed with a fine stone to produce a perfectly smooth surface of the cone-shaped tooth and shoulder.

Fig. 4.

The prepared tooth is now carefully washed, dried, and painted with a rosin solution or a suitable cavity-lining preparation. This very important step is in order to protect and close up the tubules of the tooth. It also prevents after-pain and affords great protection against infection and thermal changes.

Fig. 5.

IMPORTANCE OF THE SHOULDER.

The all-porcelain jacket crown "tooth preparation" must be ideal, that is to

say, the shoulder must be cut completely around the tooth under the free margin of the gum. (Fig. 5.) It is not necessary to cut the shoulder deep into healthy tooth structure, but in decayed places at the cervical margin it should be extended down to the depth of the decay. The tooth walls should be trimmed straight and regularly without grooves or cross cuts, undercuts, or overhanging edges on any surface.

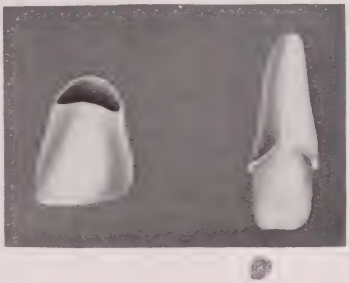
The great strength of this crown lies in its close adaptation to the perfectly prepared tooth, thus meeting the stress put upon it with the full length of the crown.

PULPLESS TOOTH PREPARATION.

A pulpless tooth, that has been properly treated and the roots filled may be prepared in the same manner as the vital tooth. If, however, the pulpless tooth is badly broken down, or has had a post crown previously, the root must be first built up properly with cement, or in most cases with a metal inlay. In order to build up such roots, gold or other metal castings should be made, so as to fit the canal and pulp chamber or decayed cavity perfectly, and also provide for an extension above the root, similar to the tooth stump left above the gum margin of an "ideal tooth preparation." (Fig. 5.) Gold or the S. S. W. Co. Weston's metal are very practical for this purpose. After the casting has been cemented to place, the shoulder may then be cut at the neck of the root. The porcelain jacket crown encircling the root will act as a Richmond band and prevent splitting of the root. (Figs. 6 and 7.)

After the shoulder is cut, the prepared root with its inlay or casting presents the same shape as that of a vital tooth preparation, and the succeeding steps are the same for both. The shoulder affords a perfect seat, and with it perfect margins and perfect carving and contouring may be obtained. It is usually at this point (at the gum margin) that all other crowns fail. By leaving no overhanging band we avoid gingival irritation, and with a good seat at the shoulder under the free margin of the gum, out of the danger zone of recurrent caries, we come nearest to natural tooth condi-

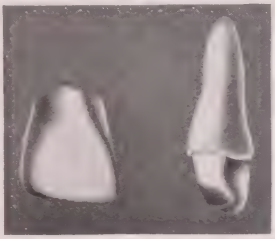
Fig. 6.



tions in the making of the all-porcelain jacket crown.

There is no material that is so favorably received by the gum tissue as is

Fig. 7.



porcelain. The gum actually hugs the porcelain, thereby preventing the entrance of foreign matter at this point, whereas, with other crowns, pockets are often formed which become the seat of septic foci.

TAKING THE IMPRESSION.

In taking the impression the tooth should be first coated with vaselin. A

Fig. 8.

Fig. 9.

seamless copper band is fitted loosely around the prepared tooth, but closely to

the gum margin. (Fig. 8.) The copper band is now filled with Kerr's modeling compound, and the impression taken. This impression should show the sharp outlines of the prepared shoulder at the neck. (Fig. 9.)

If the first impression does not prove satisfactory, dry it, add a thin layer of very soft compound over the surface, and press quickly over the tooth. This will produce a compact and sharp impression.

The band is now marked in order to distinguish the labial and buccal sides.

COLOR OF TEETH.

Selection of the proper color of the tooth is made in the usual manner. It is best to select the shade with a porcelain shade guide containing the colors of the particular porcelain from which the jacket crown is to be made. S. S. W. 2510, Justi's, Morfat's, or Consolidated porcelains are recommendable.

TAKING THE BITE.

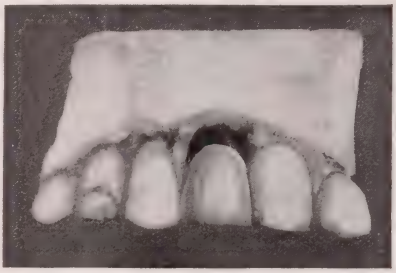
In taking the bite a roll of soft S. S. W. paraffin pink wax is worked over the prepared tooth and adjoining teeth, and the patient requested to bite into the wax (a so-called "squash" bite), which is then removed and chilled. Dry off all moisture from the wax, and with a wax stick melt more wax into this wax bite of the prepared tooth, quickly press it back over the teeth, and again allow the patient to bite, after which it is again removed and chilled. The wax bite will show sharp outlines of the prepared tooth and the adjoining teeth as well, and can be used for both impression and bite.

The taking of this impression and bite for the jacket crown is far more difficult than it may seem to the average operator, and requires great care and accuracy. I have used many other methods for taking the bite, but the one described is the simplest and most practical, if followed carefully.

PROTECTION OF THE PREPARED TOOTH.

It is necessary to protect the tooth against thermal changes during the construction of the jacket crown. The following is a very simple method of accomplishing this: A strip of white baseplate gutta-percha as wide as the desired

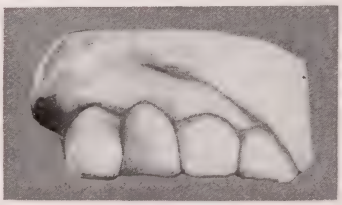
Fig. 10.



length of the crown is warmed and rolled once or twice around a smooth excavator handle, according to the width of the space.

The gutta-percha tube being trimmed to the outline of the gum margin, is softened over the alcohol flame, pressed

Fig. 11.

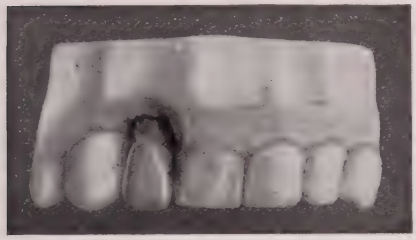


and shaped into proper position over the prepared tooth. With a little practice one can very quickly make a good gutta-percha covering, and it is most surprising how tight this covering will be and how well it will keep its shape and protect the tooth from ordinary wear. It is also of great value in keeping the gums from closing over the prepared shoulder. (Figs. 10 and 11.)

Another method of protecting the prepared tooth is as follows: Fit a Caulk's celluloid tooth form over the prepared tooth, being sure that it is large enough at the neck to fit *over the outer edge of* the shoulder.

The prepared tooth is coated with vaselin, the tooth form filled with a suitable cement and pressed into place over the tooth. (Fig. 12.) Watch the setting of the cement closely and remove the tooth form with the cement just before the cement sets. When the cement is perfectly hard, trim off the surplus, dry both the prepared tooth and the covering, and set with chloro-percha or temporary stopping.

Fig. 12.



I have often filled these tooth forms with S. S. White temporary stopping, and while soft pressed it over the prepared tooth, obtaining very satisfactory results. The Caulk's tooth forms will keep their shape, withstand mastication, and on account of their smoothness make splendid temporary coverings.

Another successful use of the celluloid tooth form is as follows: The celluloid form is first trimmed for length and contour, and then filled in with silicate cement (using two or more colors if necessary) to match the adjoining teeth. This cement tooth form can remain on the tooth until the jacket crown is ready to be set.

Care must be taken to first varnish the prepared tooth and coat it with vaselin before cementing the celluloid tooth form into place. The vaselin prevents the cement from sticking to the sensitive tooth.

To remove the cement tooth form use a thin rubber carborundum stone and cut through the cutting edge of the cement tooth form almost to the prepared tooth. Then take an enamel chisel and pry apart the cement, which will usually break away from the tooth in three pieces.

FITTING OF THE PORCELAIN JACKET CROWN.

Remove the temporary tooth form, or covering, and clean the prepared tooth of all particles of gutta-percha or cement. Great care must be exercised in trying the crown on the prepared tooth to do it gently, so as to avoid any pressure on the crown, before it is cemented into place and the cement has hardened.

Grind the mesial or distal sides of the jacket crown, if necessary, until the crown is seated, being careful not to grind off too much, as there is a possibility of losing the contact points with the adjoining teeth.

There is no other crown made that will seat itself at one and all times so perfectly as the all-porcelain jacket crown.

CEMENTING THE CROWN.

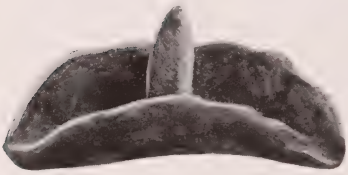
In cementing the crown to place we first carefully dry the prepared tooth, using chloroform in the case of vital teeth, as it is less painful than alcohol, but care should be taken not to remove the tooth lining with which the tooth was painted after grinding. If the lining is removed, it is most advisable to give the tooth another thin coat.

For almost all jacket crowns a light-yellow cement is most satisfactory, and is not liable to change the color of the crown. The cement should not be mixed too thick, and when the jacket crown is filled to the rim the crown should be carried over the prepared tooth with a

light rotary pressure until seated, and then held in position until the cement

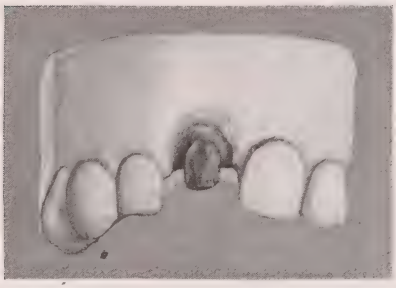
Fig. 13.

Fig. 14.



has hardened. To prevent air becoming confined in the bottom of the crown,

Fig. 15.



use a jiffy tube for filling in the crown with cement.

Part II: Ceramic.

The construction of the all-porcelain jacket crown, the making of the metal die, and the articulation of models, require absolute accuracy and care to the smallest detail.

MAKING THE METAL DIE.

A strip of thin plate wax, tin foil, or paper is forced around the tube impression and is extended about ½ inch over the tube. This is then embedded in plaster. When the plaster has hardened the amalgam is packed into this impression and built up to a pyramid shape. (Fig. 13.)

In packing the die, care must be taken to squeeze out all surplus mercury. Begin packing with soft pieces, then follow with dryer pieces, and when brought to the level exert pressure and squeeze out as much mercury as possible. In my own practice, I use special die amalgam for all crowns and inlay dies, but copper amalgam may be used with good results. All impressions packed with amalgam are left over night to harden sufficiently.

After removing the plaster core, the extending metal is marked on the side corresponding to the mark on the tube of the impression. These marks indicate the front of the tooth and prevent the misplacing of the die on the model or wax bite. The tube impression is separated from the die with warm water.

With a sandpaper wheel on the dental lathe the root-end of the metal die is now reduced to the desired shape. The die is then placed into the wax bite very carefully and an articulated model is made. (Fig. 14.) A hole is carved through the lower end of the model, to reach the base of the metal die, and the metal die pushed through the hole from the plaster model. (Fig. 15.)

MAKING THE MATRIX.

In making the matrix 1/1000 platinum foil is used. For anterior teeth it is cut and shaped as shown in Fig. 16, A; for bicuspids and molars a strip is cut and folded in at the top by cutting on two sides. The excess of foil is trimmed to allow the fold to be double-lapped,

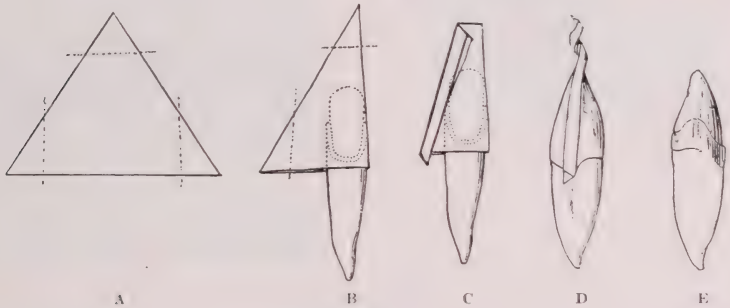
making a matrix with a double-folded lap to the mesial or distal side of the tooth (Fig. 16, C), using long-nosed cotton-pliers to fold the foil. This joint does not need to be soldered.

We next twist, or turn over, the upper end of the foil (Fig. 16, D) and cut off the excess, but allow for the closing of the top. The foil is formed with finger pressure to the die, the edges burnished with gold burnishers, put into the swager, and swaged carefully. It is necessary to burnish the foil well into the shoulder groove, getting a perfect adaptation to the groove and the edge and sides of the die. (Fig. 16, E.)

We now remove the matrix from the die, trim the overhanging edges, replace the matrix on the die, reburnish, and swage.

If for any reason the matrix cannot be easily removed from the die, melt sticky-wax over the matrix to edge of shoulder; this will permit its easy removal, after which the wax may be burned off by holding the matrix in the open flame.

Fig. 16.



The porcelain is built on with a fine brush little by little, drying and baking, repeating this operation until the case is finished. (Fig. 17.)

If the operator desires, practically the same result may be obtained as follows: A piece of base-plate wax is wrapped once around the lower end of the die, extending over the platinum foil *to the edge of the shoulder.* (Fig. 18.) Again wrap a piece of paper twice around the die, extending from the lower end to the desired height of the crown *above the shoulder,* gluing or tying the paper firmly.

Fig. 17.

Fig. 18.

PACKING IN THE PORCELAIN.

In packing the porcelain we first mix the two colors of porcelain that are to be used, keeping the colors separate, and begin packing with the body or neck color, in a similar manner to that in which we pack amalgam into an impression of a metal die. The thickness of the base-plate wax will allow plenty of space for the porcelain between the paper wrapper and the platinum matrix.

Enough of the yellow or base porcelain is packed in to cover the shoulder and the entire matrix. This base color porcelain should be trimmed off in a slanting direction from the periphery of the neck to the upper end of the matrix, before the second or enamel color porcelain is added, which will permit a fine blending of the two colors.

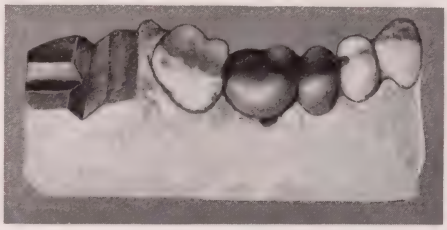
The filling-in of the porcelain has to be done slowly, in order to permit perfect drying. The drying and packing of the porcelain is done as follows: A suitable serrated instrument handle is rubbed back and forth on the lower rough end of the metal die, causing sufficient vibration so that the porcelain will settle close to the matrix and bring the moisture to the surface. The moisture is then dried off with a piece of cloth, or blotting paper. This operation is repeated from twenty-five to seventy-five times, until the desired height of the crown is obtained. The vibrating and drying of the porcelain is most important for the successful handling and finishing of the crown.

SHAPING AND CARVING THE PORCELAIN.

The paper and wax bands are carefully removed from the die and porcelain, which is now very much like chalk as the result of the vibrating and drying, and can be easily handled and carved. The excessive fulness in the circumference of the crown is just about sufficient to allow for the shrinkage in baking the porcelain.

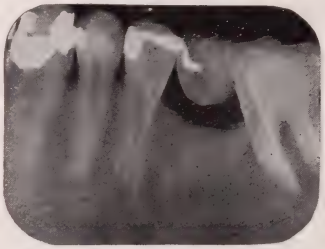
The rough carving and shaping is done with thin knives and carving instruments. It is necessary to trim away some of the adjacent plaster teeth on the plaster model, in order that the die and porcelain may be placed on the model for the final carving. The matrix with the carved porcelain is then removed from the model and metal die, and the porcelain baked to a dull glaze. When cool, the crown is again placed on the metal die and plaster model, and porcelain is added to give the desired shape, contact, and articulation. In the final baking the porcelain should be carried to a "glass" fuse.

Fig. 19.



Twin jacket all-porcelain crown, with platinum post backed into dummy and resting on bicuspid distal filling.

Fig. 20.



X-ray of case shown in Fig. 19.

To remove the matrix the platinum foil should be carefully pulled away from the edges toward the middle of the crown.

The making and baking of twin crowns (see Figs. 19 and 20) is simply

FURTHER ILLUSTRATIONS FROM CASES SHOWING ADAPTABILITY OF JACKET-CROWN RESTORATION TO VARIOUS CONDITIONS.

FIG. 21.

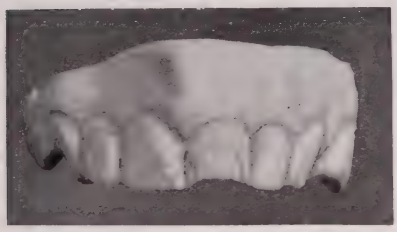
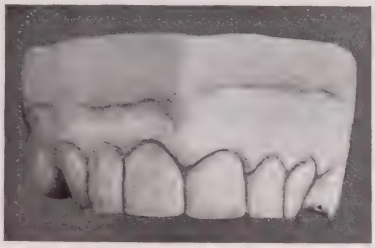


FIG. 22.



An all-porcelain jacket crown restoration of central incisor.

FIG. 23.

Radiograph of case Figs. 21 and 22 after fourteen years.

FIG. 24.

FIG. 25.

Radiographs of case Figs. 26 and 27 before and after substitution of jacket crown.

FIG. 26.

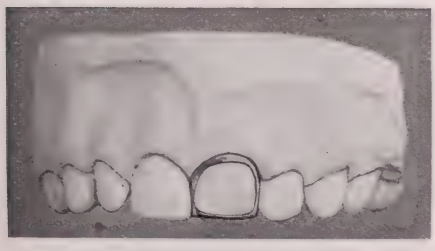
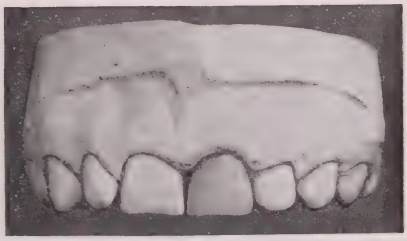


FIG. 27.



All-porcelain jacket crown restoration of a central incisor carried on an open-face gold crown.

a matter of practice and experience in making the single all-porcelain jacket crown. When a platinum post or rest is desired in twin crowns, they are built

Fig. 28.

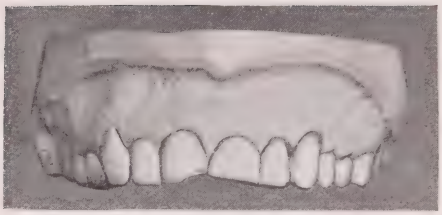
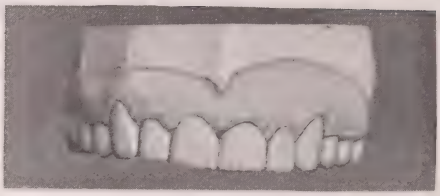


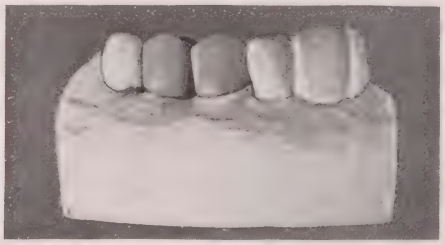
Fig. 29.



Another case of restoration of central incisors.

Fig. 30.

Fig. 31.



Showing restoration of alignment of rotated bicuspid.

Fig. 32.

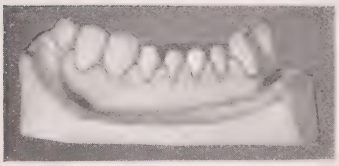


Fig. 33.

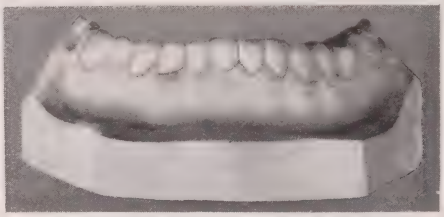


Fig. 34.

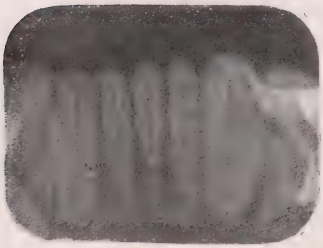
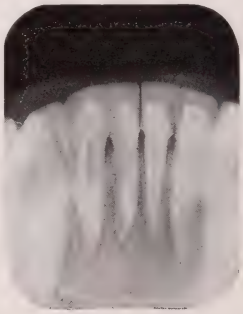


Fig. 35.



Figs. 32 to 35: Showing restoration of four lower incisors; also radiographs of case before and after treatment.

FIG. 36.

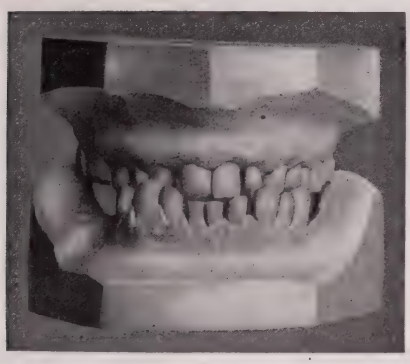
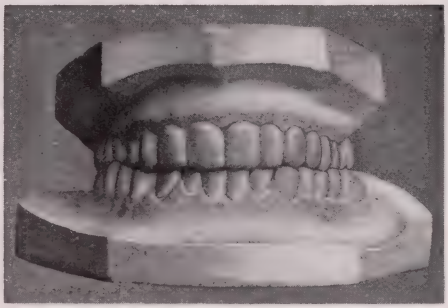


FIG. 37.



Case showing restoration of a badly mutilated mouth. Lower anterior teeth were restored to usefulness, without the devitalization of pulps, by means of all-porcelain jacket crowns.

FIG. 38.

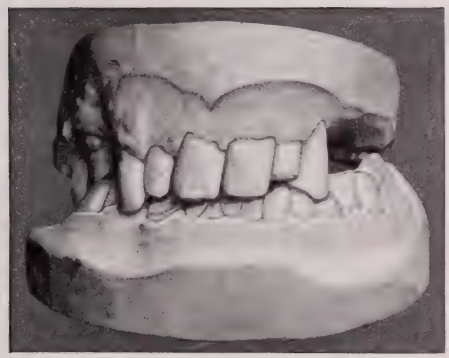
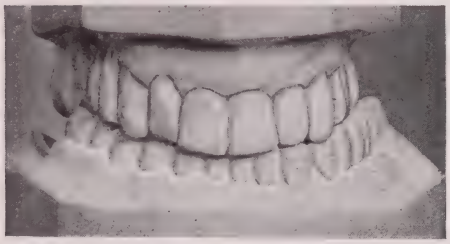


FIG. 39.



A similar case of restoration.

up and baked with the regular high-fusing porcelain post or extension. The platinum post is then inserted and baked into place with a lower-fusing porcelain.

220 MARLBORO ST.

Restoration of Abnormal Mouths by Surgical Treatment before Inserting Plates.

By JAMES P. RUYL, D.D.S., New York, N. Y.

(Read before the Northeastern Dental Association, at its annual meeting, Worcester, Mass., September 26 to 28, 1917.)

AMONG the many things which come to our notice in connection with daily practice are certain abnormalities which occur in the anterior teeth in their relation to the upper and lower jaws. Our interest, as well as a desire for making corrections, has always been excited by them, but they have baffled our efforts for many years. How often do we find mouths with partial dentures replacing the lost bicuspids and molars where the anterior upper or lower teeth—in most cases the uppers—stand out of position, with consequent protruding lips, because of faulty occlusion, and how many times have we seen dentures worn which constantly moved while the wearer was talking! Again, patients come to us who, for want of artificial dentures, show their gums during ordinary lip-movement, and when we are called upon to make plates for them we wish they had never come to our office, or we send them to the other man, so that when relatives or friends inquire as to who made their plates, the blame may not rest on us. We have all noticed these unsightly mouths as we go through the streets or sit in front of them in street cars, and while we realized that something might be done to make these people presentable or even good-looking, we inwardly hoped that nothing similar would come to us for correction.

Perhaps just as well here as anywhere a far-reaching ethical point may be mentioned. I refer to the embarrassment and sensitiveness which abnormalities of any kind bring about. Doubtless all of us have noticed how people with bodily defects have held back, painfully conscious, from mingling with others; how the happiness and freedom of spirit and even the progress of the individual has been impaired. I have known patients to cover an unsightly mouth with their hand and even refrain from smiling, and I myself have rejected an otherwise competent applicant for work because of some dental defect.

Now, for convenience I shall divide the conditions which arise from these abnormalities into four general groups. It is my intention to state them with their causes, and to give an effectual method of correction.

The first and most common one we meet, and one of the most difficult to rectify unless properly handled, is that condition which is brought about because the patient has only six or eight anterior natural teeth, bicuspids and molars having been lost, and has worn an upper denture for many years. In his endeavor to reach for food while chewing these natural teeth have gradually become loosened and elongated, and there has been a marked forward movement of the process and the teeth, with a consequent thickening of the lower lip, and the appearance of a protruding jaw, often resulting in extreme cases of pyorrhea.

In the mouths of such patients great absorption takes place in the anterior portion of the upper jaw, caused by constant hammering of the lower teeth upon

the upper, the upper receding to such an extent that they cannot be seen, giving one the impression that there are no teeth in the upper jaw at all. If one wished to make an upper denture for a patient having such conditions in the lower jaw as stated, it would be impossible to construct one that would be satisfactory, because of the lower teeth having become elongated to such an extent that they extend above the line of the occlusal plane—often as much as an eighth of an inch. If we set the centrals and laterals of the upper denture their proper length—about one-sixteenth of an inch below the upper lip line—we should create a condition in which the patient could not close his lips. Now, if we allowed the lips to meet, and did not make a correction in the lower jaw by removing the lower teeth and process, we should have to set the upper teeth so high that there would be an appearance of no teeth in the upper jaw. The result would be a sagging of the mouth, changing what may have been an animated and pliant face into one with a set stern and aged expression, and the new plate would be no better than the old one. My point is that without removal of the teeth and an operation we could not relieve the abnormality.

Next there is the abnormality due to a natural condition where the gums are long and the lips are short. People with such mouths are generally discouraged with their appearance, conscious of their defect, and, being hopeless of any improvement, are prone to neglect their teeth even to the necessary fillings. They lose their teeth early, and the dentist, in making a denture, fits the teeth to the gums, usually with no rubber against the ridge. The teeth must be ground right up to the gum, and in a short time there is an unsightly space between the gums and the teeth. Such a denture is usually very difficult to keep in position and get any degree of comfort in mastication.

The third abnormal condition, due to adenoids, thumb-sucking, and irregularities, is a pointed arch with the teeth slanting forward. Now, when such patients come to us there is no longer any possibility of regulation, usually because there are too many teeth lost, or the patient is too old and does not care to undergo treatment for correction of the irregularity.

The fourth abnormal condition is one in which dentures have been worn for many years, and in which the process has been entirely resorbed, leaving a soft flabby ridge. When it falls to the lot of the dentist to make a denture for a mouth of this kind, he, to make a good fit, puts an extremely deep air-chamber in the plate, which causes the mucous membrane to pull down and form a cauliflower-like appearance of the tissue, and because of constantly increased flabbiness, not only of the ridge, now, but also of the palatal portion, there is more movement of the plate than before.

All these four conditions must be treated surgically. To leave an unsightly condition, or to augment it, as most dentures will in an abnormal mouth, is not doing justice to a patient. As much of the superfluous process must be removed as will in the judgment of the operator restore a natural comeliness, and in many cases an improvement over nature. Even after the removal of a tooth, in cases where one does not expect to make a facial restoration, it would be advantageous both to the dentist and the patient if, at the time of extraction, the sharp pieces of process that remain where the cervical border of the tooth was were removed. This is often the case with the canine, where the process is a little thicker and more prominent. By so doing we not only hasten the time when we can take the impression, but also save the patient many hours of pain. The sharp prominences that are left by not removing the process are troublesome in eating, etc., and the thin membrane that stretches over it is only a slight protection to the process underneath, and makes it consequently very susceptible to pain.

Those cases with very soft ridges and no process underneath, the process being entirely resorbed, must be treated surgically also, by removing the tissues until

there is just a thin portion of the membrane over the bone. By so doing we place the mouth in a condition where the plate rests on a solid foundation, thus preventing its shifting, which would not be the case if the soft tissues were left. It is the same in principle as trying to build a house on a foundation of sand. The operation both for hard and soft tissue is so simple, so easily done—only an obstruction to remove—that it would be more natural to do it than not.

TECHNIQUE OF THE SURGICAL PROCEDURE.

With the exception of that condition where soft membrane is present, all abnormalities caused by bony prominences are treated in the same way. Novocain or a general anesthetic may be used; I prefer the former. If it is necessary to operate in both jaws make the injections in the upper and lower at once, and after loosening the gum around the teeth with a lancet, extract the teeth only in one jaw and remove the process. When that is finished remove the teeth from the other jaw, first loosening the gum around them as before, and remove the process. My reason for working in this way is to avoid the sponging of blood in places where you are not operating. After removing the teeth, place a blunt instrument, about a quarter of an inch wide, shaped somewhat like an ordinary wax spatula, between the process and the gum, and by leverage, using the process as a fulcrum, tear the muco-periosteum away, leaving the bone perfectly clean. This is easily done, far more easily than dissecting the gum, and causing much less bleeding. Now hold the gum-flap back, and using a bone forceps or, better still, a curved wedge-cutter, cut off as much process as necessary. The sharp edges which are left palatally and labially must be rounded off with a bur or engine stone; apply water with a syringe while doing so.

We now have the flaps of gum hanging down anteriorly and posteriorly, and they can be very easily cut off with gum scissors. Remove enough gum tissue so that the parts will not quite meet when pressed together over the process with the finger and thumb, leaving a space of about one-sixteenth to one-eighth of an inch. By thus not allowing the membrane to come together absolutely, it will be found that when the healing takes place the gum will reach over the bone and leave a firm healthy ridge. It is not necessary to use sutures at any time. Absolute healing takes place and in from a month to six weeks permanent dentures can be made. I have taken impressions for temporary plates in from five to ten days after such operations, and they were worn for from one to two years. In the operation for cases where there is a pointed arch it is generally necessary only to remove the outer plate of process in order to get the lip back to normal. One need not cut off the whole process—only the anterior portion—because in these cases the gums do not show so much, and we only want lip restoration.

For the operation upon soft flabby ridges the anesthetic injection is made in the same manner as before. Instead of beginning at one side of the ridge and cutting entirely across to the other side, begin in the center of the soft tissue and cut on one side almost to the end, leaving only enough attachment to keep the flap from dropping; then begin from the center again, and cut entirely across to the other side. The flap will now be suspended by a small piece, which can easily be clipped off. By doing this we prevent the flaps from getting in the way while operating. In these cases healing takes place so rapidly that impressions can be taken within a week or ten days. The cauliflower-like soft tissues, caused by extremely deep air-chambers, are removed in the same manner, except that a curved lancet is used. The tissues should be shaved down to the periosteum.

Such radical changes as this operation makes in the facial expression very often bring us into difficulties with the patient's family, because they have been so accustomed to the old expression that, when a correction is made, even though

the expression be markedly improved, it is often very hard to reconcile them to the alteration. However, if a proper denture producing adequate restoration is worn for a week or so, the change for the better is so quickly noticed by the rest of the family that if the old plate were put in again they would not be pleased with it.

It seems to me that this work has brought me more satisfaction than any I have ever done. To overcome difficulties which have usually been neglected, and to bring to a successful issue what was formerly a bugbear, should of course give one great pleasure, but more to me than all this is the joy I have felt in seeing my patients so well satisfied, and the knowledge that I have given them more than mere mechanical service.

40 East 41st st.

The Evolution of Orthodonty.

By WILLIAM K. GREGORY, Ph.D., New York, N. Y.,
ASSOCIATE IN PALEONTOLOGY, AMERICAN MUSEUM OF NATURAL HISTORY.

(Read before the Eastern Association of Graduates of the Angle School of Orthodontia. New York, N. Y., January 26, 1918.)

Mr. President and Gentlemen:

FIRST, I must express my pleasure at being with you again this year. Perhaps you do not realize it, but we paleontologists are more or less isolated folk, working in our own corner here, and it is very seldom that we find people who are interested in a kindred line of work. It was therefore a great satisfaction to me to meet and know a body of men who are keenly interested in some of the same problems relating to the teeth which have engaged my attention in this museum.

I changed the title of my paper with the permission of the secretary, but must apologize for using the word "orthodonty" instead of orthodontia. Orthodontia no doubt is the name of your science, but in paleontology we have a great many words in use which end in "odonty," such as hypsodonty, the condition of long-crowned teeth, and brachyodonty, of short-crowned teeth. There are also many common English words which end in "y," like necessity, for instance, and matrimony. In fact, as matrimony is a state of wedlock, so, if you will pardon my levity, orthodonty is a state of interlock between the upper and lower teeth.

We have very definite foreshadowings of the orthodont relation of upper and lower teeth far back in geologic time. I have here [illustrating] a specimen of one of the mammal-like reptiles from the Triassic period of South Africa (*Cynognathus*). You will notice that the teeth are divided into incisors, canines, premolars, and molars, that the upper jaw overhangs the lower jaw or dentition, and especially that we have an alternation of upper and lower teeth, one lower tooth articulating with two upper teeth, so that there is a zig-zag relation. These three conditions—lateral overhang, alternation, and differentiation of the teeth—are likewise characteristic of all primitive mammals.

I am going to pass over long stretches of geological time, and come now to a period late in the Age of Reptiles, when the great dinosaurs flourished. There were then several distinct kinds of mam-

malian teeth, but we shall look only at one of these, that shown in the accompanying enlarged model of a lower molar (Fig. 1), because it represents the extremely primitive type which Professor Cope called "tritubercular," having reference to the three tubercles, or cusps, on the summit of the crown.

In the upper jaw there were also triangular teeth, and these upper and lower teeth interlock, or alternate, as shown in the diagram Fig. 2, *A*. We have a possible representative of that type existing at the present day in the pouched mole *Notoryctes* of Australia. We see in this animal almost the exact relation between upper and lower molars that obtained in those far-off mammals of the Age of Reptiles. The lower teeth, as you see, are wedged in between the upper teeth. We have, then, this wedgelike stage in which the wedges of the upper jaw are pointed inward, and the wedges of the lower jaw are directed to the outer side. That was a fundamental relation in all the later, high types of mammalian teeth, and there is abundant evidence to show that to be a primitive condition for later mammals, no matter how it arose. It is an alternating and interlocking condition.

Fig. 1.

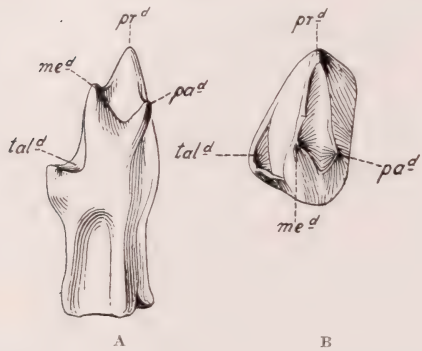


Diagram of a primitive tritubercular left lower molar *(Phascolestes)*. A, Lingual aspect. B, Crown view. Greatly enlarged.

In the upper molar crowns there is at this stage chiefly a wedge, and very little else in this type of tooth. In the lower teeth we find a slight beginning of a posterior spur, or talonid. That is the beginning of an overlapping relation. We have first interlock, and then interlock plus overlap. In our terminology we call this anterior part the trigonid, or wedge-shape portion of the lower tooth, and we call this lower and posterior part the talonid. The trigonid is the part that fits between the upper teeth, while the talonid is the part that overlaps.

All this occurred during the Age of Reptiles; we had progressed at least that far. At the beginning of the Age of Mammals we find a further stage (Fig. 2, *B*). In the more primitive mammals of the Eocene period we find the normal tritubercular type, in which the overlapping relations are better developed, because the talonid has now widened considerably, so that there is a perfect alternation and interlock. The lower molars still fit into the spaces between the upper, but this posterior extension or talonid now overlaps broadly, so we have the stage of overlap well defined. This kind of lower molar was called by Professor Cope the tuberculo-sectorial type, the sectorial part being this wedgelike trigonid, while the tubercular portion is the talonid. The tuberculo-sectorial type is the ground plan of which we still find traces in modern carnivorous mammals, and even in herbivorous mammals, in primates, and in insectivorous mammals.

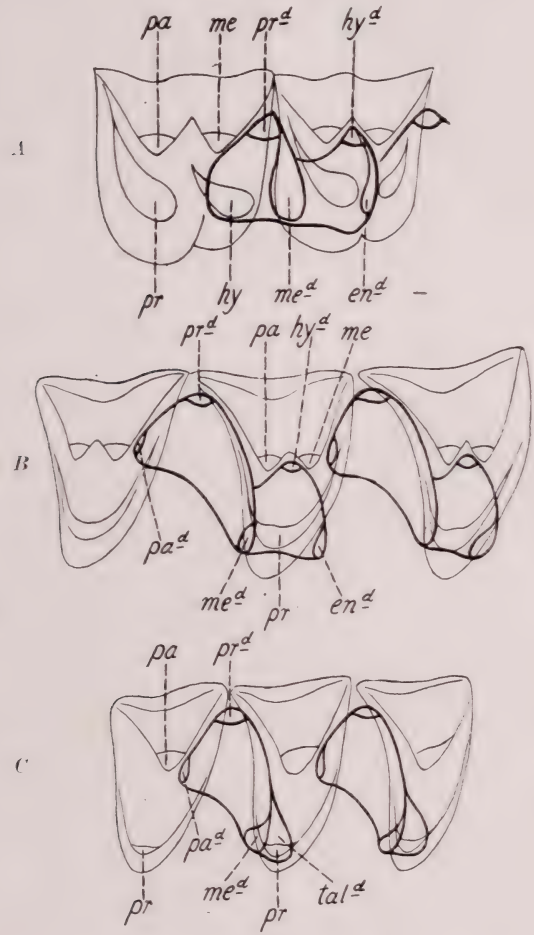
Fig. 3 illustrates the tuberculo-sectorial type in an Eocene carnivorous mammal (*Sinopa*), in which one readily sees these molar wedges and the talonids; one lower wedge fits accurately into the spaces between two upper wedges, while the talonids overlap on the crowns of the upper molars.

A very important feature of this arrangement is that the internal part of the upper tooth, the lingual part, fits into the talonid of the lower (Fig. 2, *B*). That relation holds throughout the normal mammals, and is equally true in our own teeth.

In this primitive stage the upper teeth are still wedge-shaped, or triangular, while in later, more specialized types they lose the triangular form. There are still spaces between the teeth, which

are of the greatest functional importance in the early types of teeth.

Fig. 2.



Interlocking relations of upper and lower molars in three stages of evolution. Lower teeth in thick black lines. *A*, Late Mesozoic stage (based on *Kurtodon* and *Dryolestes*). Interlocking wedges. Lower molars with incipient talonids. *B*, Lower Eocene stage, based on many primitive placental mammals. Talonid of lower molars overlapping on upper molars. *C*, Upper Eocene and later stage in many grinding types. Antero-posterior diameter of molars increased, talonid of lowers widened, fitting between the now well-separated para- and metacones. Hypocones of upper molars overlapping into trigonid basin of lower molars.

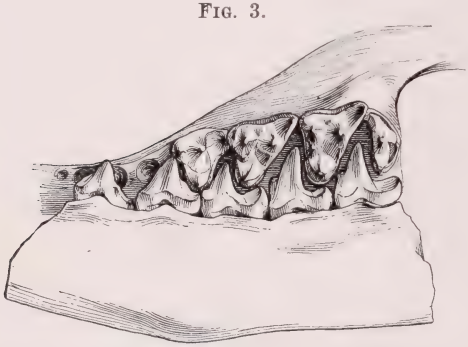
Each molar crown of this kind of tooth contains two distinct parts. It contains first, cutting edges, and secondly piercing or crushing points or cusps. The cutting edges become very important in later carnivorous types, especially the one on the posterior side of the upper tooth (metastyle shear). If we wish to

make a shearing tooth out of this triangular type, we simply elongate this posterior part (metastyle shear). On the other hand, if we wish to make a crushing tooth, we emphasize the cusps and broaden the crowns so as to obliterate the spaces between them.

EVOLUTION OF SHEARING TEETH.

Here is the first line of evolution coming from these primitive trituberculo-sectorial types. It is the shearing type, which is illustrated by this set of models showing the upper carnassial teeth in

FIG. 3.



Upper and lower molars of an Eocene carnivore (*Sinopa grangeri* Matthew).

two widely distinct races of ancient carnivora. The lower ones belong to the family of hyænodonts, while the upper ones belong to the family of the dogs. The primitive form is a triangular type. Simply by the emphasis of this posterior cutting shear in successive ages we see a triangular tooth transformed into a long shearing tooth. The tooth becomes narrower transversely, and greatly elongated antero-posteriorly. A posterior cutting shear is developed in many different races of mammals in this way. These two series, which were studied by Dr. Matthew of this museum, belong to totally different families, and yet the end results are very similar.

The evolution of shearing teeth, then, is one extreme. It is associated with a rigidly vertical, or orthal movement of the jaw. Here, in an ordinary cat [illustrating], you find this shearing dentition strongly developed. In the upper carnassial here is the shear, and here is the inner cusp greatly reduced. In the lower molar two of the cusps (protoconid and paraconid) of the trigonid become shearlike; the third (metaconid), together with the talonid, disappears. The jaw muscles in these shearing types are adapted to pull the jaw straight up, so that the sides of the teeth shear past each other. That is a great principle of shearing teeth and orthal jaw movement; the edges and sides, and not the crown, are the important functional parts. This line of evolution takes place independently in different families of mammals. Here [illustrating] is a carnivorous marsupial, where this shearing type of dentition is developed. And here is a common opossum, which is still in a very primitive stage.

In an opposite line of evolution the emphasis is all laid on the breaking and crushing parts. The points or cusps become predominant, and the overlap of one part on another becomes emphasized, so that it is now the surfaces of the crowns that oppose each other, rather than the sides. A good example of that is seen in the bear, where we have great flat crowns working one against the other, with very little of the cutting function left. This involves the filling out of the space between the two teeth. We no longer find these spaces, but we have now the wide overlap of the lower teeth upon the upper, with a great emphasis of the bruising and crushing parts. That kind of evolution is carried to an extreme in the dentition of the sea-otter, the molar teeth being adapted for crushing and bruising the shellfish that the animal feeds on. The contact is more on the surface than on the sides of the crowns, and the cutting blades have been entirely sacrificed. We have various intermediate stages to connect this with the stem type; in fact, all the diverse cutting and crushing molar types are derived from the primitive wedgelike type.

Thus one may say that the crushing type is a degenerate derivative of the

tritubercular type; the teeth simply lose their sharp edges and the points become blunt. There is a hingelike joint of the lower jaw, and all the muscles are adapted for pulling the jaw straight up.

EVOLUTION OF CRUSHING AND GRINDING TEETH.

One very important feature in the evolution of both the crushing and the grinding types (the next stage to be considered) is the change from a wedge shape to a quadrangular crown. This upper molar of a raccoon [illustrating] has the primitive triangular pattern, but at the posterior internal angle there is also a swelling growing out to form another cusp. This is called a hypocone, according to Professor Osborn's system. We find that it tends to obliterate the triangular pattern. The development of a hypocone takes place not only in pure crushing types with orthal jaw motion, but also in grinding types, where lateral motion is possible.

We come, then to the grinding types. The hypocone or posterior cusp becomes greatly developed, so that the primitive triangular symmetry is lost, and the crown becomes quadrangular. Another feature of grinding types is that the cusps themselves lose their primitive character, and become modeled into various crests and ridges. Here, for example, is a primitive form of herbivorous mammal (*Phenacodus*), but there is now but little suggestion of the former triangular contour of that tooth. Every stage can be traced, however, in the development of this postero-internal cusp, and it is no doubt a secondary feature. Notice that these cusps are now modeled into low ridges that stretch obliquely across the crowns. These crests and the crescents of other grinding types function in connection with the swing of the mandible from side to side.

In this tapir the four cusps of the upper molars are united into two cross crests, and in the lower molars we have the same union of opposite pairs of cusps. That is associated with a movement of the jaw that is quite different from the vertical, orthal movement of primitive tritubercular types. It is called the ental movement, because it is from the outside to the center of the tooth. This ental swing of the jaw is clearly deducible from the character and details of the worn teeth. The external pterygoid muscle is always well developed in these types. Here is a fossa for the insertion of that muscle on the inside just below the condyle. When the external pterygoid muscle of one side is contracted the condyle moves forward in the glenoid socket of the same side, and the jaw projects toward the opposite side. Thus pure grinding types are associated with the development of ridges and cross crests, and with a more less lateral swing of the mandible.

Even the most complex of the grinding patterns have been traced back to the more primitive quadrangular types, and eventually to the tritubercular wedge-like type.

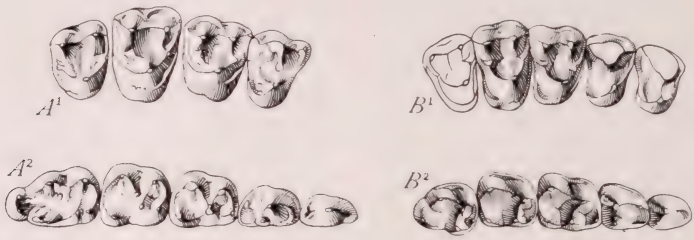
In this diagram (Fig. 2, *C*) I have endeavored to express the linking of opposite cusps into ridges and the filling out of the contour of the crowns, now become quadrangular in form, with correlated obliteration of the spaces between the successive molars, and the relations of the upper and lower crests, in a generalized grinding type of molars.

Having reviewed the general adaptive radiation of the primitive tritubercular molars into the cutting, crushing, grinding, and mixed types, we may review the evolution of the molar patterns in the primates. The primates exhibit a wide range of adaptive radiation, from primitive tritubercular types to elaborate crested types, and they vary from an orthal movement of the jaw to a marked ental movement. As illustrations of the primitive primate type I may exhibit Figs. 4 and 5. Here are the upper and lower molar teeth of two genera of primates from the Eocene of Wyoming. They are triangular in form, and very primitive. The lower teeth also are of the primitive tuberculo-sectorial type, with a high trigonid and a low and broad talonid. (See Fig. 5.) You can trace many variations in form from this

primitive type. Here [illustrating] is the actual history of that type through ascending levels in a single family; the latest type has lost the triangular symmetry, and has become quadrangular in form. We can follow the evolution with great definiteness, and at the same time trace the change from a more vertical movement of the jaw to an oblique side swing.

Here [illustrating] are several recent lemurs which preserve the primitive tritubercular type with relatively little modification. In another lemur, however (*Hapalemur*), the molar cusps are becoming round and blunt, and are losing their originally sharp-edged character. That animal is tending to sacrifice the shearing function, and its molars are becoming more or less of the crushing type. In *Propithecus*, another lemur, the molar crowns are becoming crescentic,

Fig. 4.

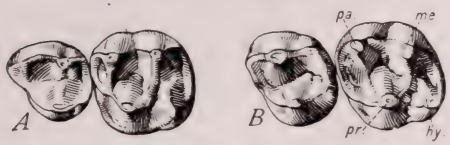


Upper and lower molars of two very primitive North American Eocene primates, exhibiting the primitive tritubercular upper molars and tuberculo-sectorial lower molars. A^1,A^2, *Pelycodus trigonodus*. Family Adapidæ. Lower Eocene. Wyo. (× 2 : 1.) B^1,B^2, *Omomys* sp. Family Tarsiidæ. Middle Eocene, Wyoming. (× 3 : 1.)

Fig. 5.

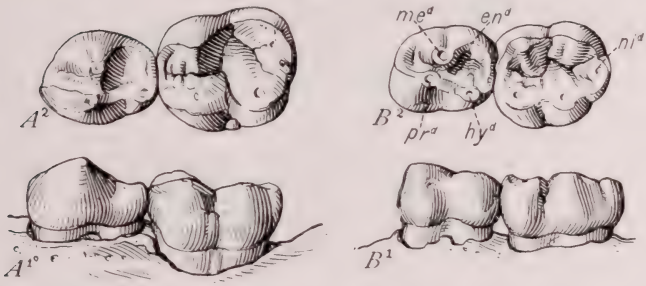
Interlocking relations of the upper and lower molars in a primitive Eocene primate (*Pelycodus trigonodus*). Seen from the lingual side. (× 3 : 1.)

FIG. 6.



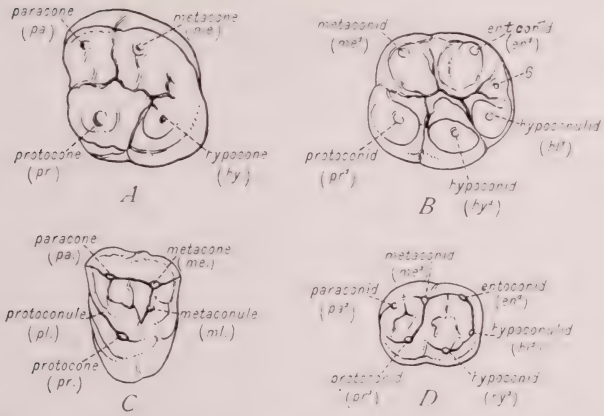
Upper milk molars of a chimpanzee (*A*) and of *Homo sapiens* (*B*), showing the agreement in fundamental pattern. (× 3 : 2.)

FIG. 7.



Lower milk molars of a chimpanzee (A^1,A^2) and of *Homo sapiens* (B^1,B^2), showing agreement in fundamental pattern.

FIG. 8.



Names of the molar cusps in man (*A*, *B*) and in a primitive Eocene primate (*Pelycodus*, *C*, *D*). This system of names was invented by Professor Osborn in 1888, and is now used all over the world by paleontologists. *A*, Second left upper molar of a Kaffir. (× 3 : 2.) *B*, Second left lower molar of an Australian black. (× 3 : 2.) The human lower molar has lost the paraconid. An accessory cusp (6) is developed in some anthropoids and men. *C*, Second left upper molar of *Pelycodus trigonodus*, a Lower Eocene primate. (× 3 : 1.) *D*, Second left lower molar of the same. (× 3 : 1.)

and the jaw swings obliquely sidewise. The side swing of the mandible is also shown in this South American howler monkey (*Alouatta*). The jaw sweeps from the outside inward, just as does the jaw of the tapir, and one can see clearly from the character and articular relations of the upper and lower crowns how the jaw works. That is also borne out by the form of the condyle and of the glenoid fossa, which permits considerable side swing. The ridges and cusps in this specimen are very much worn off, but they are all clearly homologizable with the original primate type shown in Fig. 4. In the macaque-baboon series the four main cusps of each molar are linked in opposite pairs, which tend to form cross ridges.

When we come to the anthropoid series, which culminates in man, we find a mixed type. It is neither a pure crushing type, nor a shearing type, nor altogether a grinding type. The jaw is capable of considerable side swing, but the molar pattern is really rather primitive, even in the most progressive anthropoid, which is the gorilla. In modern man the molar pattern is partly retrogressive.

Fig. 9.

Interlocking relations of the upper and lower cheek teeth. *A*, *Pelycodus trigonodus*, a Lower Eocene lemuroid, with primitive molar patterns. *B*, Gorilla sp. *C*, *Homo sapiens* (Australian Black). The premolars in this specimen are irregular in position. In this position the jaw projects toward the right. *D*, *Homo sapiens* (Negro). When the jaw projects toward the right, the upper and lower molars in this specimen assume an end-to-end relation.

In the orang and chimpanzee we find the ancient tritubercular symmetry of the upper molar crown disguised by this hypocone, which buds out at the postero-internal corner. Similarly in this lower molar we find the tuberculo-sectorial pattern much disguised, but one can still distinguish the remnant of the trigonid, which has lost the paraconid, and one can see that the talonid has become very large and wrinkled.

Here [illustrating] (Figs. 6 and 7) is the milk dentition of the chimpanzee. All that posterior part of the lower molar is the talonid, which is now greatly enlarged, and overlaps widely the upper molar. The result of this overlapping tendency is seen in the human dentition, producing the occasional end-to-end relation of the upper and lower molars with which you are all familiar.

This [illustrating] is a model of the skull of a fossil man (*Homo heidelbergensis*) from the early Pleistocene period in Europe, as reconstructed by Professor McGregor. It has the human dental arch, although it is estimated to be about 250,000 years old. In the molars we see none of the primitive shearing and cutting action of the primitive primate type, but instead of a chiefly orthal movement of the jaw we have now more of a mill-like action, a more or less sweeping or grinding action which has polished off or worn down the separate cusps into a fairly even plane. One can readily homologize the molar cusps by comparison with the chimpanzee.

This grinding motion no doubt followed upon the reduction of the canines and the retraction of the lower canines; it accompanied the shortening and curving of the dental arch in man. I need not speak further of the changes in the front teeth, with which you are all familiar. The dwindling lower canines have withdrawn from their primitive position in front of the upper canines and are now in a secondary position, which occurs in the human race alone. This general pattern of the arch and of the molars is eminently adapted for the more or less rotary motion of the jaw.

This diagram (Fig. 9) shows the relation of the upper and lower teeth in successive stages of primates. In the lower Eocene primates we have an interlocking of the upper and lower molars in the primitive tritubercular fashion. (See also Fig. 5.) In the gorilla (Fig. 9, *B*) and other anthropoids we find a great overlap of the lower molars upon the upper, the talonid of the lower teeth being greatly enlarged, and the trigonid reduced. In the more primitive human types we still get this combined interlocking and overlapping of the upper and lower teeth, but in some cases the overlapping parts become greatly emphasized, while the primitive interlocking part (trigonid) is further reduced. Also we still have the fact that the protocone of the upper fits into the talonid basin of the lower teeth.

In conclusion, therefore, I would emphasize the fact that the human dentition is simply a special modification of the primate series, and that these fundamental interlocking and overlapping relations, which you in your practice encounter daily, may be traced back to the beginning of the Age of Mammals.

REFERENCES.

Osborn, H. F. 1907. "Evolution of Mammalian Molar Teeth. To and From the Triangular Type." New York: The Macmillan Company.

Gidley, J. W. 1906. "Evidence Bearing on Tooth-cusp Development," *Proc. Washington Acad. Sci.*, vol. viii, pp. 91–110, pl. iv, v.

Gregory, W. K. 1916. The Cope-Osborn "Theory of Trituberculy" and the "Ancestral Molar Patterns of the Primates," *Bull. Amer. Mus. Nat. Hist.*, vol. xxxv, pp. 239–257. ("Studies on the Evolution of the Primates—Part I.")

Gregory, W. K. 1916. "Phylogeny of Recent and Extinct Anthropoids, with Special Reference to the Origin of Man," *Bull. Amer. Mus. Nat. Hist.*, vol. xxxv, pp. 258–355. ("Studies on the Evolution of the Primates—Part II.")

77th st. and Central Park, West.

[See also *Discussion*, as reported under "Proceedings of Societies," this issue.]

On Healthy and Diseased Conditions of the Alveolar Processes of the Jaws.

By A. HOPEWELL-SMITH, L.R.C.P., M.R.C.S., L.D.S., Philadelphia, Pa.,
PROFESSOR OF DENTAL HISTOLOGY, HISTOPATHOLOGY, AND COMPARATIVE ODONTOLOGY, THOMAS W. EVANS DENTAL INSTITUTE SCHOOL OF DENTISTRY, UNIVERSITY OF PENNSYLVANIA.

(Read at the meeting of the Eastern Association of Graduates of the Angle School of Orthodontia, January 26, 1918, held at the American Museum of Natural History, New York, N. Y.)

INTRODUCTORY.

HUMAN teeth are attached to the skeleton by means of a fixed, immovable joint or articulation, in which their conical root portions are inserted, like nails driven into a piece of wood, into sockets called the alveoli of the alveolar processes of the maxillæ and mandible. "Alveolus" means a hole. Contrary to the generally accepted but unanatomical view, the teeth are firmly fixed, at all events normally, into the bone. An apparent movement in four directions can be noted by the use of finger and thumb, but the application of pressure by the digits gives rise to a false and erroneous impression. There is no appreciable movement of the teeth in their articulations. This immobility can be noted and verified by examining any collection of human skulls. The loose teeth found in such skulls have been loosened by disease.

THE ARTICULATION OF THE TEETH IN THE VERTEBRATES AND IN MAN (GOMPHOSIS).

The articulation of the teeth in man is designated gomphosis, a purely Greek word meaning "a bolting or nailing together." It is a variety of the class of articulations termed *synarthrosis,* which denotes an immovable joint. In the synarthroses the articulating surfaces of the bones are in almost direct contact, being joined by a thin intervening layer of fibrous or cartilaginous connective tissue. Examples of these are found in the joints between the facial and cranial bones, with the sole exception of the temporo-mandibular articulation.

There are four varieties of synarthrosis, viz: (1) *Sutura,* as in the skull bones, which are fastened together by fibrous tissue called sutural membrane; (2) *schindylesis,* in which one bone fits into a groove in the other; (3) *synchondrosis,* where the connective medium is cartilage; (4) *gomphosis,* comparable to that of a tenon or peg of one bone being received into the mortise or cavity of another. This latter obtains in the dental articulation of man and in the higher vertebrates.

Among the lower vertebrates, the fish present several different means of attaching the teeth to the jaws. There may be, for instance, a ligamentous articulation, an osseous ankylosis to the so-called "bone of attachment," a "hinge" form, and a gomphosis as in man. Gomphosis in fish may be modified into a true fibrous gomphosis, a double gomphosis, and a bony gomphosis. Amongst reptiles generally, the method of union is by bony ankylosis; but in the crocodile sockets are found.

It is important to bear these facts in mind when considering the methods of attachment of the human teeth to the

jaws, for they throw considerable light on problems relating to the subject of this communication.

THE RELATIONSHIPS, STRUCTURE, AND FUNCTIONS OF THE PARTS.

Of all the structural elements in the teeth associated with their articulation, the bony socket, the alveolo-dental periosteum, the cementum, and the gingival tissues are of the highest importance. It is necessary to discuss briefly and succinctly the normal relationships, structure, and functions of these several parts as they occur in man.

I. THE CEMENTUM.

The cementum may be regarded structurally as merely a dense, hard shell of calcified material, homologous with that kind of tissue which covers the surfaces of bones generally, known as the peripheric lamellæ of bone. It measures only 175 to 250 microns (140th to 100th of an inch) in thickness; it contains, in spite of erroneous beliefs, no lacunæ and canaliculi, no Haversian systems, no bloodvessels, and no nerves. Fully calcified, well-formed tissue consists of a structureless matrix, but often its make-up is revealed in the presence of incremental lines, perforating canals and fibers, and Sharpey's fibers in their containing tubes.

Its relationship to enamel at the necks of the teeth is such that normally the two tissues are in absolute contact, meeting edge to edge. This occurs in 30 per cent. of cases examined for the purpose. Enamel overlaps cementum in 0.5 per cent. of cases, and cementum overlaps enamel in 60 per cent. of cases. According to Choquet,(1) in 27.5 per cent. of cases there is a breach of continuity between the two tissues and a minute portion of the dentin is actually exposed.

The function of cementum is to serve as a dense, non-sensitive, inert covering for the dentin of the roots of the teeth (as possessing no nerves it cannot generate nervous impulses), and affords strong attachment by means of Sharpey's fibers to the principal fibers of the periodontal membrane.

II. THE ALVEOLO-DENTAL PERIOSTEUM.

The alveolo-dental periosteum is a modified form of periosteum which forms the soft vascular covering of bones. It differs by being placed between two hard, unyielding walls, cementum on the one side and alveolar bone on the other. It varies in width from 0.4 to 0.6 mm. (about a 50th of an inch), and is composed of bundles of strong white connective fibers, no elastic fibers being demonstrable. It has a scanty vascular and nervous supply. Osteoblasts and epithelial "rests" are also found, the former in great numbers, the latter sometimes altogether absent. A gingival gland and a lymphatic system in the periodontal membrane exist only in the imagination of incompetent observers.

Its functions are important. They are fourfold, viz, physical, sensory, nutrient, and formative.

A. (*a*) It affords a strong fibrous attachment to the roots of the teeth. (*b*) It provides a layer of soft material in which bloodvessels and nerves ramify without risk of damage or permanent injury by mechanical shock. (*c*) It may act as an apparatus for diminishing the force of compression with an opposing body, whether it be dental in origin or otherwise.

B. It is sensory, through its nerve supply—a beneficent arrangement on the part of nature.

C. Like the periosteum of other bones, it possesses a certain amount of trophic or nutritive influence on the alveolar walls of the dental sockets.

D. It is formative, in that it is capable of very frequently providing, by virtue of its osteoblasts, fresh tissue (hyperplasic cementum) on its inner aspects; which is an evidence of its reaction to injury, whether it be of a traumatic, chemical, or bacteriological character.

III. THE GINGIVAL TISSUE.

The gingival tissue includes those soft, dense structures which envelop the alveo-

lar processes of the jaws. Consisting of mucous and submucous tissue, it exhibits on its free surface the stratified squamous epithelium common to the other parts of the mucous membrane of the oral cavity; and, beneath, numerous closely interwoven bundles of fibrous connective tissue arranged in the form of simple and compound papillæ, and containing also adipose tissue, mucous glands, bloodvessels, nerve fibers, and sometimes the so-called "glands" of Serres.

The gingival tissue is attached to the cementum at the necks of the teeth, and blends insensibly with the fibers of the periodontal membrane. The gum over the interdental septa is of similar structure.

On account of its smooth surface the gum acts as a protective covering for the alveolar processes of the jaws—to the periosteum of which it is also nutritive through its blood supply. It fills up the interdental spaces, and thus largely prevents the lodgment of food in these situations. By means of its mucous glands it has some share in the lubrication of the mouth. It furnishes bloodvessels to the periodontal membrane.

IV. THE ALVEOLAR PROCESSES.

The alveolar processes are constructed of hard bone which is neither typically compact nor cancellous. The external alveolar plate is thinner and terminates in a sharper edge than the internal alveolar plate. In man the structure of the bone is far from being typical, as will presently be shown.

Functionally, the alveoli serve to support the teeth. A fact of primary importance is that the bony alveoli grow up with and are molded, during developmental periods of growth, around the roots of the teeth. "Teeth do not come down and take possession of sockets more or less already made and pre-existent, but the socket is subservient to the position of the tooth; for wherever the latter may chance to get, in eruption, there its socket will be built up around it."(2) In short, the position of the tooth determines that of its socket.

SIGNIFICANCE OF THE "LAMINA DURA" AND THE GINGIVAL TROUGH.

Immediately surrounding the periodontal membrane is the lamina dura, an infinitely thin shell of compact bone, well displayed in good radiographs of the parts. The lamina dura becomes easily and at an early period affected by disease, undergoing halisteresis or decalcification, and also lacunar absorption, and thereby diminishing the firm dental attachment to the alveolar bone. This degeneration is greatly predisposed to by the contents of the gingival trough. The gingival trough at the cervical margins of the teeth is bounded externally by the oral epithelium, internally by enamel, and below by its firm union with the cementum. Its depth, even in children, is from 2.3 mm. to 4 mm.

It contains, as a normal condition, epithelial débris, phagocytes, and always countless numbers of bacteria, chiefly those belonging to the *Streptococcus* and *Micrococcus catarrhalis* groups.

ATROPHY OR PHYSIOLOGICAL ABSORPTION OF THE BONE.

The alveolar bone is a particularly transitory and unstable structure. Osseous tissue in general is frequently undergoing changes, from the time of its first formation. And these changes are most pronounced in the alveolar processes of man.

It is a diploëtic tissue similar in almost all points to that cancellous tissue which intervenes between the two plates of the cranial bones, such as the parietal The histological features of the alveolar processes vary according to their position. Thus, in that of the canine fossa, even in subjects of ten and a half years, the bone is scantily supplied with Haversian systems, portions contain no lamellæ, and but few lacunæ and canaliculi, the matrix being coarsely granular. Many of the lacunæ are abrachiate.

The lattice-like character of the bone of the interdental septa corresponds with the spongy bone of the carpus and tarsus, and expanded ends of the tibia and fe-

mur. The lamellæ are disposed in lines parallel with the edges of the large medullary spaces in the bone, and in the alveolar processes the cancellous spaces run longitudinally in the same direction as the long axes of the teeth. The Haversian systems and lacunæ are marked, and the thin peripheric lamellæ are slightly denser than in other parts. The terminal free rim, however, is so thin that there is little, if any, room to accommodate any medullary tissue or Haversian canals. It has thus an impoverished blood supply, and its vitality is necessarily very low.

The significance of this fact will be at once appreciated when general disturbances of the circulatory system, such as anemia or hyperemia, as well as when general marasmus or marantic or senile changes are beginning to become manifest.

The result is absorption of this terminal edge or rim—(1) physiological in the case of old age (an elastic term not necessarily governed by the number of years of the individual), and (2) pathological, due to disease of the neighboring parts. Most animals *in ferâ naturâ* lose their teeth by shedding, through this physiological absorption of their sockets; the same is true in man, too, but in the latter the process is greatly aggravated and accelerated by incipient disease. The effects of civilization have not only been felt by the teeth, but by their sockets also.

The reasons for this predisposition for absorption, or atrophy, or wasting on the parts of the sockets of the teeth are as follow:

(1) The unique character of the osseous tissue, to which reference has been already made.

(2) The inadequacy of the blood supply, with consequent tendency to malnutrition.

(3) The absence of muscular attachments.

(4) The practically functionless character of the articulation. Bone exists primarily for the attachment of the muscles. In the jaws a few fibers only of the buccinator may be attached to the molar regions of the maxillæ and mandible.

EVIDENCES OF SIMILAR CONDITIONS IN THE JAWS OF MAN AND THE LOWER ANIMALS.

Not only does bone undergo this physiological absorption, but dentin and cementum do, too.

(1) This is noted immediately on the examination of a vertical section of the jaws of a mammal, *e.g.* a kitten before the deciduous teeth are shed; it is also exemplified in the teeth of animals which have a polyphyodont dentition, as the crocodile.

(2) The same process occurs in man. The apical portions of the roots of deciduous teeth become painlessly absorbed by the working of natural laws, even if they be not followed by permanent successors. Radiographs show this fact.

In these cases, histologically the process would appear to be identical with pathological conditions. The hard parts are removed by the agency of myeloplaxes, or osteoclasts, and very frequently the process of repair may be seen going on side by side with the process of absorption.

(3) If skulls of children of about four or five or six years be examined, the phenomena associated with the shedding of the deciduous teeth and their sockets can be followed very well. There is here a physiological absorption of bone, the immediate effect being the thinning of the tissue by a method similar to that of osteoporosis.

Thus there is an entire absorption and complete loss of the sockets of the deciduous teeth occurring in a normal painless way. Writing about this absorption Tomes([3]) says: "The alveolar portion of the jaw, that which lies above the level of the inferior dental canal, is developed around the milk teeth; when they are lost, it disappears, to be re-formed again for the second set of teeth, and is finally wholly removed after the loss of the teeth in old age."

(4) The skulls of adults show a similar wasting of bone around the cervical

radicular portions of teeth. They frequently demonstrate osseous atrophy over the labial surface of the mandibular canine, and over the palatal aspect of the palatine root of the maxillary molar, as well as in other places.

(5) The changes undergone by the bone of the mandible are well known. Again to quote Mr. Tomes:

As the jaw undergoes increase in size, large additions are made to its surface by deposition of bone from the periosteum, necessarily lengthening the canal. The additions to the canal do not, however, take place quite in the line of its original course, but in this added portion it is bent a little outward and upward. If we rasp off the bone of an adult jaw down to the level of this bend, *a process which nature in great part performs for us in an aged jaw*, or if instead we make due allowance for the alteration, the mental foramen becomes an available fixed point for measurement.

The manner in which the jaw is formed might also be described as wasteful; a very large amount of bone is formed which is subsequently, at no distant date, again removed by *absorption;* or we might compare it to a modeling process, in which thick, comparatively shapeless masses are dabbed on, to be trimmed and pared down into form.

To bring it more clearly home to the student's mind, if all the bone ever formed were to remain, the coronoid process would extend from the condyle to the region of the first premolar, and all the teeth behind that would be buried in its base; there would be no "neck" beneath the condyle, but the internal oblique line would be a thick bar corresponding in width with the condyle. It is necessary to fully realize that the articular surface with its cartilage has successively occupied every spot along this line; and as it progresses backward by the deposition of fresh bone in its cartilage, it has been followed up by the process of absorption removing all that was redundant.

On the outer surface of the jaw we can frequently discern a slight ridge, extending a short distance from the head of the bone; but if the prominence were preserved on the inner surface, the inferior dental artery and nerve would be turned out of their course. We have thus a speedy removal of the newly formed bone, so that a concavity lies immediately on the inner side of the condyle; and microscopic examination of the bone at this point shows that the *lacunæ of Howship, those characteristic evidences of absorption, abundantly cover its surface, showing that here at least absorption is most actively going on.*

In the same way the coronoid process, beneath the base of which the first, second, and third molars have successively been formed, has moved backward by absorption cutting away its anterior, and by deposition adding to its posterior surfaces.

In old age, concomitantly with the diminution of muscular energy, the bone about the angle *wastes*, so that once more the ramus appears to meet the body at an obtuse angle. But all the changes which mark an aged jaw are the simple results of a *superficial and not of an interstitial absorption*, corresponding with a wasting of the muscles, of the pterygoid plates of the sphenoid bone. [The writer's italics.]

(6) Two further instructive examples from comparative anatomy may be given. In *Batrachia*, e.g. the frog, the teeth are attached by their bases and external surfaces to a groove in the jaw, having the exterior wall higher than the inner, and also having on their outer side a new osseous development, which slightly extends over the outer side of each tooth. The deficiency on its inner aspect is supplied by a bony pillar, which disappears when the tooth is shed, a new column being developed for the succeeding tooth. But an even more interesting fact is observed in the mouth of the eel. Here the teeth are fixed to the jaws by means of a "bone of attachment." When the teeth are shed, the bone of attachment is shed also, being removed from the body of the jaw itself. This is effected by means of large multinucleated giant cells, which leave the surface of the bone scalloped out into Howship's foveolæ. It is often impossible to decide, under the microscope, whether the tissue which is being absorbed by these myeloplaxes is normal or diseased, so closely identical are the two processes.

(7) It is certain that the free alveolar edges of the jaws of man begin to disappear at a very early age. Radiographs, for instance, show the commencement of the absorption of the bone around the roots of the deciduous incisors in the normal mouths of children.

The commencement of the atrophy can be noticed in the incisor as well as the molar region. The laminæ duræ remain intact except at the gingival margins.

Examples need not be further multiplied; the truth is so apparent.

(8) Finally, a quotation from two eminent authorities on general and special pathology may close this portion of the subject. Hektoen and Riesman([4]) write:

> It is generally believed that anemia of bone favors absorption and hinders apposition, and it may be one of the factors in these forms of atrophy. The atrophy may be concentric or eccentric. It begins, as a rule, at those points that are free from muscular attachments. In the calvaria the bone becomes thin, granular, and finely porous, especially in the temporal regions; as atrophy occurs in the external table, the internal may become rough from the production of new bone. In the maxillæ the alveolar process may disappear completely.

PATHOLOGICAL CHANGES IN THE OSSEOUS AND FIBROUS TISSUES INDUCED BY MECHANICAL FORCES.

Regarding this aspect of the subject, current literature furnishes considerable data, to be found in the writings of Angle,([5]) Sir Arbuthnot Lane,([6]) Henry Baker,([7]) Lawrence Baker,([8]) Bogue,([9]) G. V. I. Brown,([10]) Buckley,([11]) Case,([12]) Cryer,([13]) Hartzell,([14]) Hawley,([15]) Keith,([16]) Ketcham,([17]) Körbitz,([18]) Landsberger,([19]) Lischer,([20]) Noyes,([21]) Ottolengui,([22]) Pullen,([23]) Spiller,([24]) Summa,([25]) Talbot,([26]) Young,([27]) etc. Out of this mass of evidence and observation there would appear to emerge a general belief that—

First: If slight force is applied, an absorption of the bony tissue on the side away from the point of delivery, and the slow development of osseous material on the side next to it, would occur, the absorption would be similar in its phenomena to the physiological absorption just noticed, and the deposition of bone would be accomplished normally by the osteoblasts which clothe in enormous numbers the surface. Some writers claim to have demonstrated bending of the bone.

Secondly: If strong force is applied, an inflammatory condition of the periodontal membrane is undoubtedly induced, which leads to loosening of the teeth, a hyperplasic condition of the cementum, and a local circumdental osteomyelitis of the alveolar process.

Thirdly: If the strongest force is applied, as in the operation of immediate regulation, a green-stick fracture of one of the alveolar plates is brought about, and an ensuing inflammation of all the tissues is involved.

PATHOLOGICAL CHANGES INDUCED BY DISEASE.

Local anemia is often produced by disturbances of the vaso-constrictor and vaso-dilator systems of the vessel walls. The arteries become narrow, and this increases the resistance to the blood current. The blood reaches the capillaries under low pressure. The capillaries contract and the total quantity of blood in a given area is diminished. Macroscopically the signs are paleness of the tissues; but on account of the dense covering of the gingival region by means of the stratified squamous epithelium, the blanching of the parts can generally be recognized only by comparison with healthier localities.

Anemia favors absorption, as has already been pointed out. The make-up of bone is influenced by two functions: static, *i.e.* the lines along which pressure is exerted, and mechanical, *i.e.* the direction in which muscles pull. With regard to the first, which applies only to the subject under consideration, the whole of the internal structure of the alveolar process is changed.

Absorption occurs either in the form of lacunar destruction by means of giant cells, or by a method of decalcification termed halisteresis, or by so-called perforating canals filled with vascular connective tissue which passes across the lamellæ from one Haversian canal to another, as demonstrated by Pommer.([28]) Atrophy due to pressure is very common in bones generally; it can be produced by continuous pressure exerted by slowly

growing tumors, by contracting cutaneous cicatrices, or by inflammation as in the maxillary sinus and the middle ear, etc. Senile and marantic atrophy occur in young and old who suffer from marasmus or general wasting due to various chronic diseases or malnutrition.

Hyperemia favors a consolidation of bone tissue or hyperplasia, in which the tissue elements are increased in large numbers. If it remains only as a hyperemia, and does not pass on to acute inflammation, the condition continues stable, and is therefore desirable; but unfortunately it leads to absorption of bone and cementum. True bony union or ankylosis of cementum and alveolar process occurs only rarely, about a dozen cases having been recorded so far.

The result of a stomatitis or gingivitis, simple or purulent, pyorrheic or non-infective, acute or chronic, is generally to produce an inflammation of the periodontal membrane, which has as its sequelæ hyperplasia of the cementum and absorption and disappearance of the bony socket.

These are the probable accompaniments of tooth movement, but as yet our knowledge of this subject remains very incomplete, and one cannot dogmatize on the matter until more sections of the teeth *in situ* which have been moved by mechanical means have been made, examined, and studied.

REFERENCES.

1. Choquet. "Précis d'Anatomie Dentaire."

2. Tomes. "Dental Anatomy," 1914.

3. Tomes. *Op. cit.*

4. Hektoen and Riesman. "Text-book of Pathology," 1901.

5. Angle. "Malocclusion of the Teeth," *Trans. Amer. Soc. Orthodontia*, 1902.

6. Arbuthnot Lane. *Trans. Odontological Section, Royal Soc. Medicine*, 1902.

7. Baker, H. A. *Trans. Amer. Soc. Orthodontia*, 1907.

8. Baker, L. *Items of Interest*, 1911.

9. Bogue. *Brit. Med. Journal*, 1905.

10. Brown, G. V. I. Dental Cosmos, 1909.

11. Buckley. *Trans. Amer. Soc. Orthodontia*, 1911.

12. Case. Dental Cosmos, 1905.

13. Cryer. *Trans. Amer. Soc. Orthodontia*, 1902.

14. Hartz. *Trans. Amer. Soc. Orthodontia*, 1908.

15. Hawley. Dental Cosmos, 1912.

16. Keith. *Brit. Journ. Dental Science*, 1909.

17. Ketcham. Dental Cosmos, 1912.

18. Körbitz. *Brit. Dental Journal*, 1911.

19. Landsberger. *Corresp. für Zahnarzte*, 1909.

20. Lischer. "Principles and Methods of Orthodontics."

21. Noyes. *Items of Interest*, 1904.

22. Ottolengui. *Trans. Amer. Soc. Orthodontia*, 1907.

23. Pullen. Dental Cosmos, 1912.

24. Spiller. *Dental Record*, 1911.

25. Summa. *Items of Interest*, 1906.

26. Talbot. "Irregularities of the Teeth."

27. Young. Dental Cosmos, 1909.

28. Pommer. "Osteomalacia and Rhachitis," 1885.

40th and Spruce sts.

[See also *Discussion*, as reported under "Proceedings of Societies," this issue.]

Radiolucency of Chloro-percha in the Radiograph.

By W. CLYDE DAVIS, M.D., D.D.S., Lincoln, Nebr.

WHILE doing some research work relative to root-canal fillings and focal oral infection, I was impressed by the large number of root-fillings I had personally placed which showed a healthy apical region with the root-filling apparently extending only one-half or two-thirds of the way to the apex, the remaining one-half or one-third showing as though there existed an entirely unfilled canal, easy of access, yet small.

I therefore made the following experiment, which I would advise every radiographer to perform, in order to prove my findings.

I prepared four small straight root-canals, as found in lower centrals. I opened them with a small reamer until the broach would protrude slightly through the apical end. I flooded the canals with eucalyptol, then pumped into the canals chloro-percha, as used by dentists generally for the past thirty years. This was pumped into the canal until it formed in a ball beyond the apex. A canal point was forced into the canal one-half the length of the canal, the point having been previously measured and cut to one-half the length of the root. The excess chloro-percha was then wiped off the end of the root.

These roots were then lightly waxed to the face side of a film and exposed full time, at the usual distance. The film showed nothing in the apical half of the roots, while the canal point showed up clearly for the portion it occupied.

The above is easily proved, and prompts me to ask, How much does the radiograph show us about the presence or absence of root-fillings placed during the past thirty years?

I am at present using a radiopaque chloro-percha made by adding 8 grains of bismuth subnitrate to each dram of chloroform before dissolving the gutta-percha.

Dentists and radiographers should try this experiment, and think a bit before they make a diagnosis of "No root-filling" from a roentgenogram in which the apical third of a root-canal appears to be unfilled.

OLIVER BLDG.

CORRESPONDENCE

The Naval Dental Surgeon at Work.

To the Editor of the Dental Cosmos:

Sir,—Please allow me to extend my personal thanks for the support that you are giving the Naval Dental Corps in regard to the legislation now before Congress. May I take this as an opportunity to say a few words on behalf of the corps?

The field of operation for the naval dental surgeon is an unusually large one—much more so than is realized by the greater number of people. On our larger ships we find from 1000 to 1500 men. Considering the rapidity of the growth of the navy you will readily see that the greater part of these men are new to the service. Many of them are boys between the ages of seventeen and twenty-one years—in other words, just at the point where they start to pay attention to the teeth and oral cavity—and a large per cent. of them have never before had any dental work done for them.

Take my own work, for example: I have about 1200 men under by care, and find that there is all the work that I can take care of in the alloted hours—namely, from 8.30 A.M. to 4.30 P.M. In the mornings from 8.30 until 9.00 we hold what we call "sick call." At that time I see all new patients and those old ones who have either missed a previous appointment or have been dismissed for any period under treatment. The rest of the day is divided into fifteen- and thirty-minute periods for appointments. An appointment card is given to the patient and this excuses him from any duty during the stated period. We manage to see an average of 12 patients every day, and find that by this procedure we are able to complete about forty cases each month. By a completed case I mean one in which all the work I am permitted to do has been finished and the patient's mouth left in an aseptic condition.

When I was first assigned to this ship they had been without the services of a dental surgeon for nearly a year; consequently I found a number of very bad cases. The sick list at that time was very large. Now, having been here nearly nine months, it is with a great deal of satisfaction that I note a marked decrease in the size of the sick list, and a better appearance of the men in general. Of course the dental work may not be at all responsible for the change, nevertheless I feel that cleaning up the mouths of the men and giving thorough instruction in oral prophylaxis has had a noticeable effect for the better.

Some of my most interesting cases have been fractures of the mandible, and so far I have had very good success in treating them. I have also implanted natural teeth in several instances, and while it is too early to judge of results, I am inclined to think they are satisfactory.

I have tried to point out the importance of our work, and to show the results that are being derived from it, and I am sure that my case is similar to that of every dental surgeon in the service. Is not a man who is *free from all infectious or painful teeth* a much better man to have guarding our seas than one who is continually suffering from these conditions?

Yours truly,

E. W. Willett,
Dental Surgeon, U. S. N.

U. S. S. "Florida," Feb. 28, 1918.

PROCEEDINGS OF SOCIETIES

Eastern Association of Graduates of the Angle School of Orthodontia.

Regular Meeting, held in New York City, Saturday, January 26, 1918.

(Continued from page 334.)

AFTERNOON SESSION.

(Continued.)

THE next item on the program for the afternoon session was the reading of a paper by WM. K. GREGORY, Ph.D., New York, N. Y., entitled "The Evolution of Orthodonty."

[This paper is printed in full at page 417 of the present issue of the COSMOS.]

DISCUSSION.

Prof. H. F. Osborn. Dr. Gregory is a very modest man. His principal discovery, I might say, is in the intimate mechanical and spatial relations of the upper and lower cusps to each other, and the fact that the spatial relations have remained unchanged from the very beginning. A projection of the lower crown upon the upper crown will show that the protocone always has exactly the same spatial position with relation to the hypocone spur projecting from the lower teeth. The position of the protocone is absolutely constant throughout the entire mammal series. Dr. Gregory has made a very special study and a distinct contribution to odontology in this discovery.

So far as the general theory of the teeth goes, Dr. Gregory has given us an epitome of all the work that has been done since 1880, when Cope discovered the principle of trituberculy.

It always has seemed to me one of the most wonderful things in all nature that the primitive triangular form has furnished the material, so to speak, on which every possible variety of tooth is evolved, from the highly effective shearing teeth of the carnivora to the tubercular teeth of man and the wonderful grinding teeth of horses; that through the entire series we can always select a cusp and be absolutely sure of the history of that cusp going back to the most remote period that we can find.

It is rather interesting to note that while Dr. Gregory and I have been working together, we have reached opposite views as to the theory of the origin of the primitive triangle, but this has never produced the slightest disharmony between us. Violent personal differences sometimes arise from such differences of opinion, but we are perhaps better friends than ever. It remains to be seen from future paleontological discovery which opinion proves to be correct. As the evidence stands at present, I think the odds are rather in favor of Dr. Gregory's opinion.

Dr. Milo Hellman. Before offering any remarks on the discussion of Dr. Gregory's paper, I wish to congratulate the society upon the honor of having present at this meeting a man whose name is most intimately associated with the evolution of teeth. I refer to Pro-

fessor Osborn. It is to be regretted that the dental profession has failed so far to take cognizance of the fact that Professor Osborn has given the scientific world a terminology of the cusps of the teeth which is not only clear, descriptive, and concise, but also of great evolutional significance. It is my sincere hope that some day we shall realize its value, and introduce its usage in all scientific dental literature.

Dr. Gregory has given us the evolution or traced the relationship of the cusps of the upper and lower teeth. He has shown that what we term normal occlusion, or normal mechanical relationship of the teeth, really dates back over a considerable stretch of time. Up to the present under normal conditions we can see that we still have a plan that probably has existed for millions of years. In modern man there is a tendency manifesting itself which threatens to upset this plan. The causes thereof, though not quite definitely ascertained, may be of evolutional, phylogenetic, ontogenetic, or pathologic origin. The result, however, is found to be quite clearly confined to the development of the jaws as indicated by the malrelationship of the teeth. So far, the one actual diagnostic factor in orthodontia is the recognition of the disturbance of development by the malrelation of the cusps of the teeth. The aim of orthodontia today is the restoration of occlusion and interference with maldevelopment. It is therefore of great importance to watch and observe whether the work accomplished by the orthodontists is merely restorative, or whether it has some prophylactic value; *i.e.* whether it may be possible to intercept or interfere with the present tendency of malocclusal occurrences in coming generations.

I also wish to direct the attention of those present to the fact that in order to justify our work on scientific grounds it is necessary to get the viewpoints of such men as we have with us today. Also, that in order to learn to appreciate their opinion we should take advantage of the opportunities offered by such institutions as this (the American Museum of Natural History) or the National Museum at Washington. We shall find in these institutions a wealth of material, paleontological and anatomical, for various studies, and also come under the guidance and influence of the foremost scientists of the country. Thus we shall be led to realize the true value of orthodontia. For while we deal with the improvement of the individual, we are really also contributing something to the improvement of the race.

I also want to impress you with another fact, *i.e.* that the main idea of my endeavor to have us meet in this institution and obtain these men to deliver lectures to us was to show our members a path by which we may arrive at a better understanding of the various scientific angles from which our specialty may be approached.

In conclusion, I wish to express my gratitude to Professor Osborn, Dr. Gregory, and Mr. Sullivan for their co-operation and their willingness to aid us in every way to help in the advancement of science from our standpoint.

The President. I am sure Dr. Hellman has expressed sentiments which we all feel. We cannot say anything which in any way indicates the impression this lecture has given, because we have not had experience in the same direction, but it is probable that most of us have had experiences which have called for the same type of effort. I am not surprised that the gentlemen do not say more in discussion, but I am sure we all appreciate the efforts of Dr. Gregory.

Dr. Gregory (closing the discussion). First, referring to the more than kind remarks which Professor Osborn made, I want to call attention to the fact that I did not touch at all upon the question of the *origin* of the wedgelike tritubercular type of teeth. I simply stated that this is the primitive type that we find during the latter part of the Age of Reptiles, and that these other types were derived from it during the Age of Mammals.

While my conclusions, and those of some other investigators, were somewhat different from Professor Osborn's as to the probable steps leading up to the first

stage, no one who is familiar with the practical evidence at the present day would seriously challenge the fact that from this stage onward the story is perfectly clear. That is Professor Osborn's great contribution to the study of the history of the teeth—that he assembled so much evidence; and there is also so much evidence in this museum which is not yet published, in many families and orders of mammals, tending to show that the tritubercular type is the real starting-point of such diverse molars as, for example, a carnassial, flesh-cutting tooth on the one hand, and a crested herbivorous tooth on the other. I said nothing about the origin of the tritubercular type, because until we get more remains of mammals during the Age of Reptiles, we cannot say whether the inner or the outer cusp is the older, which is really the chief point at issue between the two different schools of paleontologists.

Secondly, as far as I can see, the correlation of upper and lower teeth is much closer and more rigid in types with an orthal jaw motion, as in some of the carnivora. That is, there is not so much opportunity for variations in the exact relations between the parts of the upper and lower teeth; every point in the lower must fit in one corresponding space or depression in the upper series; but where there is a side swing there is room for a great variety of patterns, and there is also considerable variation both in the precise placing of the cusps of the upper and lower teeth, so that possibly the orthodont relations between the cusps is much more exact in some individuals than in others.

In studying the orthodont relations of the teeth of Eocene lemurs I have found that when the lower teeth sweep across the upper there is more chance for certain parts to slide across each other; for example, in one animal a certain lower cusp (entoconid) articulates a little lower down on the internal cusp of the upper molar, and in another a little farther up. Therefore I venture to ask you, as specialists, whether the human type, with its comparatively flattened crown and milling jaw motion, may not have wider range of possible orthodont relations than in such animals as have a rigid orthal motion, as in the carnivora?

The President. It is seldom that we have upon the same occasion two lectures of such great value as we have had this afternoon, and I shall be pleased to entertain a motion of thanks to Dr. Gregory and Mr. Sullivan.

Dr. Hellman made such a motion, and it was carried unanimously.

The meeting then adjourned until 8 P.M.

Evening Session.

The evening session was held at the Museum of Natural History, the president, Dr. Murlless, calling the members to order at 8.30 o'clock.

The President. The next order of business is a paper "On Healthy and Diseased Conditions of the Alveolar Processes of the Jaws," by Dr. A. Hopewell-Smith, Philadelphia, Pa.

[This paper is printed in full at page 426 of the present issue of the Cosmos.]

DISCUSSION.

Dr. Wm. K. Gregory. I would like to ask Dr. Hopewell-Smith about a certain point shown in one of his slides. It showed a basal cingulum on the molar teeth of the hyæna. That is a structure of great interest to the paleontologist, because the cingulum is very characteristic of the teeth of the most ancient mammals, and it is very likely that the ancestors of many living groups once possessed strongly developed cingula in both the upper and the lower molars, and that later the cingulum became atrophied, and in man has nearly disappeared. In man Carabelli's cusp seems to represent the remains of the cingulum, as shown in primitive types of human molars and in the chimpanzee. I would like to ask Dr. Hopewell-Smith what his idea would be as to the function of the cingulum in the hyæna, and also as to its minute structure.

Mr. L. R. Sullivan. Dr. Hopewell-Smith's paper was highly instructive. I was especially interested in his remarks on the degeneration of the molar series in modern man, and the statement that the incisor teeth are usually the last to be lost. I am wondering whether or not Dr. Hopewell-Smith can throw any light on that condition of the molar teeth known as "taurodontism." This condition is characteristic of the Neanderthal and Heidelberg molars. The roots of the teeth are shorter and less distinct than in *Homo sapiens*. Should this character be regarded as a specialization or a retrogression?

Dr. Milo Hellman. What I am particularly interested in, and what I think should be of interest to most orthodontists, is the question of the effect of anemia and hyperemia upon the tissues involved in orthodontic operations. I think this question has a great bearing on the degree of response obtained during treatment. Dr. Hopewell-Smith has made it clear that under anemic conditions bone absorption is enhanced. It would therefore, account in many instances for the perverse conditions brought about in response to the mechanical stimulation by means of the orthodontic appliance. This is one point of value in the paper that has a direct bearing upon our work.

Another point is the question of hyperemia. I did not quite get the essayist's idea of its influence upon the bone changes occurring during treatment. I think, however, that it has an intensifying effect upon the calcification of the bone. If that is so, the bone would not be as responsive to pressure as normal bone.

A further statement of interest is the one Dr. Hopewell-Smith made with regard to the resorption of bone with age. If I understood him correctly, he said the absorption is not interstitial. I should like him to explain that. I have seen sections of long bones, as well as of jawbones, which show that with the increase of age the thickness and number of bone spicula in the spongy bone portions decrease; for instance, the head of the femur in a young person has a great many more and stouter spicula than that of an old individual; in the young the spicula cover a larger area than in the old, but with the increase of age the number of spicula decreases. What is true of the long bones is also true of the cancellous portions in the jawbones. If this is so, would it not constitute interstitial resorption of bone?

With regard to the intensification of the bone portions situated between the roots of the molar teeth of anthropoid apes, I would like to ask whether the essayist has observed similar sections of the same species in young individuals, and whether the tissues are of different texture. For instance, I have in mind the orang. The orang dentition shows a considerable amount of wear at an early age. The wear of the teeth in the upper jaw, for instance, is at the expense of the lingual cusps of the premolars and molars. In proportion as this is manifested by the teeth the apical two-thirds of the buccal roots of the molars become denuded, and are visible through the external plate of the alveolar process.

I would therefore ask Dr. Hopewell-Smith to tell us if he has observed any such sections of the same species in the young before the projection of the roots occurs, and if the bone tissue situated between the molar roots is of a like texture in the young as observed in the adult animals.

It would seem that the dense bone tissue referred to by Dr. Hopewell-Smith is the buccal plate of the alveolar process after such change has taken place in the dentition of the ape.

Dr. H. C. Ferris. I want to thank Dr. Hopewell-Smith for his excellent presentation of the question. I want to ask a question or two in reference to pathological findings pertaining to our work. One is, whether he has noticed any differential pathological picture radiographically in osteomyelitis in other parts of the body than in this region of ours?

Another practical point is: We frequently have radiographic records made of cases that we are working upon, and find a very much thickened area in the region of the teeth under continuous

movement. Those pictures are often diagnosed as pathological, due to infection. At the completion of our work, that tissue seems to be rebuilt and gives a normal radiograph. If you would explain to us the histological process as compared with the pathological, I think it would be of great interest.

Dr. B. W. Weinberger. I desire to ask Dr. Hopewell-Smith his opinion concerning the absorption of the roots of teeth. This was not quite clear in his paper just read. He mentioned the non-eruption of laterals, but failed to state the cause of absorption of deciduous molars where there were no premolars to take their place. Is it the vitality of the bone structure, or is there some other explanation as to the cause of absorption?

Dr. Frank Gough. Along the same line Dr. Weinberger has spoken of, I would like to first state that in my observation of radiographs, there have been many cases in which the roots of the deciduous teeth would be absorbed, and in others they would not. Even in the same mouth, an upper second deciduous molar on the right side, which was not succeeded by a permanent tooth, had fully formed roots and no absorption whatever, while on the opposite side the roots were entirely absorbed, and there was no bony attachment whatever.

Dr. B. W. Weinberger. In line with my first question and extending the question asked by Dr. Gough, we find a great many cases where either the anterior or posterior roots of a deciduous molar will absorb and the other roots of the same tooth will remain normal, thus preventing the premolar from erupting. Has the essayist any explanation to offer for these phenomena?

Dr. Hopewell-Smith (closing the discussion). In regard to the question of Dr. Gregory, I think I might say that the structure of the cingulum is probably very much like an anatomical condition found in the deciduous teeth. The deciduous molars, for example, possess constricted necks below the enamel. There is a special bending there of the dentinal tubes, and I believe, although I have not examined particularly the cingulum of the hyæna, that we should find the same condition there. No doubt the presence in a deciduous molar of a rather prominent cervical edge of enamel acts as a preventive of injury to the succeeding tooth. In relation to the second premolar in man, probably the internal cusp may be an elevation of the end of the cingulum. That is an interesting point, but not thoroughly determined.

A question was asked as to the late retention of the mandibular incisors in a certain picture I showed on the screen. I have not examined the jaw microscopically, but I believe the alveolar process is retained, because of its resemblance to compact bone elsewhere. There would seem to be a condition of the bone here which has a different structure from other portions of the alveolar process.

I should regard bone absorption as a retrogressive step. I think it must be considered so, because I am of the opinion that the teeth themselves are degenerate as well as their sockets. Man is anatomically a degenerate being.

Dr. Hellman asked about hyperemia. There is not very much known about its effects on the subject under discussion, because there are not sufficient data. We can only surmise that anemia favors absorption, and hyperemia, I think I said, favors a consolidation of the bone. If it remains a hyperemia, well and good; but if it goes on to an acute inflammation, an absorption of the alveolar processes occurs at the same time. It is not quite clear which is better—anemia or hyperemia; both are bad.

There is simply a change in which the medullary spaces become enlarged, and the bone becomes osteoporous—thinner and fragile—and breaks easily. Osteoporosis is frequently found in old people who have been bedridden for years, and even the moving of the person from one bed to another may cause the fracture of, say, the femur because of that condition. Patients in hospitals frequently have fractures of the femur from just that cause.

As far as I know, the sockets are very closely allied in man and the anthropoid apes. I have not studied that point very extensively.

Dr. Ferris. At the present time, the study of pathological conditions in mouths being treated by the general practitioner is being severely criticized by the medical fraternity at large; they are trying to put the burden of infection upon the dentist. The medical man is also closely observing the orthodontist, and once in a while, when examining mouths where there are a dozen pictures taken, for instance, of one jaw, he finds conditions in the region of our work which appear to be a thickening of the area, and immediately marks that as a pathological area. Then he immediately asks us for an explanation. In several instances I have claimed that the condition was due to a normal—or rather a traumatic—disturbance due to the pressure of my apparatus. The slow, continuous pressure I believe has set up a minute multiple fracture in all the lacunæ of the bone, and I think that was the cause for the thickening shown in the picture. After the case has been retained and functions restored for six or eight months, other pictures have been taken, and they show the region cleared up. I would like to know whether I was right or wrong in my conclusion.

Dr. Hopewell-Smith. I think with a slow movement you are causing a hyperemic condition of the parts. You also get probably some hyperplasia of the parts. You do not mean rarification?

Dr. Ferris. No; where absorption has taken place, of course there is a rarefied area.

Dr. Hopewell-Smith. My opinion is that it is exceedingly difficult to tell just what is going on there. You may see an area where the rays pass through more clearly, and that may be an alveolar abscess, a dental cyst, or a sarcoma. I had a case of a man with a fractured maxilla, which was properly treated. An X-ray was taken. Six weeks after, when union was established, another X-ray photograph was taken, and showed no formation of callus, in spite of the fact that it existed. We have not yet learned to always interpret X-ray photographs correctly.

Dr. Ferris. If pressure is applied to a root, is a hyperemic condition stimulated, and would that prevent the ray from passing through?

Dr. Hopewell-Smith. Yes; I think that would be the case. If there is rapid movement, you would get a fracture.

Dr. Ferris. You spoke of the local pathological condition, such as pyorrhea; but you made no mention of the constitutional condition.

Dr. Hopewell-Smith. Except by malnutrition and chronic wasting by disease. It leads to anemia.

Dr. Ferris. Is there no differential picture shown?

Dr. Hopewell-Smith. I do not think so.

Dr. Ferris. In cases of arrested development, or sclerosis, we determine by the X-ray whether the process was underdeveloped, or whether it was natural.

Dr. Hopewell-Smith. I do not think I can enlighten you further on that.

In regard to the question about absorption, someone asked why the tooth should remain longer on one side than on the other. I think it depends largely on the vitality of the tooth. If it is a "dead" tooth, I do not think it absorbs as readily as a vital tooth, and the fact of the tooth being vital or devitalized I think would account for the absorption of one root and not another. At times part of the pulp may die, and part of it remain vital; and when absorption is going on, the part containing the vital tissue would absorb much more readily than the other part which was not vital.

I am sorry I have not been able to clear up all the questions, but I thank you very much for your kind attention.

Dr. Hellman moved a vote of thanks to Dr. Hopewell-Smith for his very excellent paper. The motion was unanimously carried.

Dr. Hellman also moved that the secretary write a letter of thanks to the president of the Museum for the very courteous treatment accorded the society. The motion was carried.

Dr. Lawrence Baker of Boston then showed a number of lantern slides of skulls illustrating the harmonious relation between arch form and head form, after which the society adjourned.

THE DENTAL COSMOS

A MONTHLY RECORD OF DENTAL SCIENCE.

Devoted to the Interests of the Profession.

EDWARD C. KIRK, D.D.S., Sc.D., LL.D., *Editor.*
L. PIERCE ANTHONY, D.D.S., *Associate Editor.*

PUBLISHED BY THE S. S. WHITE DENTAL MFG. CO., PHILADELPHIA, PA.

SUBSCRIPTION PRICE, including postage, $1.00 a year to all parts of the United States, Hawaiian Islands, the Philippines, Guam, Porto Rico, Virgin Islands, Cuba, and Mexico. Canada, $1.40. To other foreign countries, $1.75 a year.

Original contributions, society reports, and other correspondence intended for publication should be addressed to the EDITOR, Lock Box 1615, Philadelphia, Pa.

Subscriptions and communications relating to advertisements should be addressed to the BUSINESS MANAGER of the DENTAL COSMOS, Lock Box 1615, Philadelphia, Pa.

PHILADELPHIA, MAY 1918.

EDITORIAL DEPARTMENT

Dentistry in the New Era.

"THE rapid strides which dentistry is and has been making along the highway of professional progress" is a statement which, in one form or another, has become trite from frequent repetition. This progressive development manifests itself in a variety of ways, and is estimated from a number of different angles depending upon the point of view of the observer.

In past decades the changes of eloquence were rung in terms of wonder and admiration on the ingenuity and resourcefulness displayed in the development of the technique and armamentarium of the up-to-date dental operator, his mechanical skill, his craftsmanship, his manipulative ability. We hear less of these things today; they have become matters of course and are taken for granted. The latter-day development has taken a new direction, or, more accurately, a more intensive growth along an old and one-time subsidiary course, namely, its function as an important department of the healing art. No one today who is alive to the

meaning and significance of the modern trend of thought in health matters thinks of dentistry in any other terms than as a factor of health. The dentist recognizes for himself and for his profession that his service is primarily directed toward the cure and prevention of disease. The lay public seeks dental service with the same object. Step by step the relations of dental and oral disorders to general health conditions are being defined by scientific research and by clinical observation and experience, so that the earlier and indefinite ideas concerning the relations of sound teeth and a clean mouth to a healthy body are being rapidly confirmed by a mass of data which make clear just what and how important these interrelationships of oral conditions and bodily health and disease really are.

The real progress of dentistry, then, is that phase of its development which has brought about a recognition of its normal relationships with the science and art of healing. It is not within the purpose of this writing to direct attention to the various factors that have wrought out the present dominating motive in dental activity, but rather to call attention to some of the results which seem reasonably certain to flow therefrom.

The oral hygiene propaganda, viewed broadly, has served to educate the public in the belief that a long category of diseases have their hitherto unsuspected origin in the infected mouth—a view amply confirmed by the studies and observations of physicians and dentists alike, and in many cases verified by scientific research. Besides the disorders arising from an unclean mouth are the infections dependent upon apical root diseases, and further, the increasing number of reflex nervous disturbances originating from physical irritation of the peripheral nerve filaments ending in and about crowded or impacted teeth—the choreas, dementia, epilepsy, neuralgia, etc., of malocclusion. The list, already a long one, is also an increasing one as investigation continues to bring to light fresh evidence of the dental origin of many of these heretofore obscure conditions.

In view of the rapidly increasing evidence of the important rôle which the teeth and their disorders play in relation to general health—and this fact taken in connection with systematic and wide dissemination of information concerning the general health relations through oral hygiene propaganda, through medical channels, and lately through such agencies as the Preparedness League and the

Dental Surgeons Corps of the army and navy—we must expect and prepare for a largely increased demand for dental service on behalf of the major part of our population who are at present inadequately served dentally or are without dental service altogether.

To minister to the needs of our national population of one hundred millions of people we have in round numbers fifty thousand dentists, or one dentist to two thousand of population, which is, roughly speaking, one-fourth of the number of dentists required.

When from time to time these figures have been under discussion, the objection has been urged that "Only a minor proportion of the population seek the services of the dentist"; and again, it has been as frequently said that "Dentistry is a luxury which only a relatively few can afford." Taken together, it is not at all unlikely that in a considerable degree the latter may stand to the former objection in the relation of cause and effect. At any rate, it is evident that the demand for dental service is a growing one, and one which seems destined to grow in increasing ratio. It has already reached the point where the question of bringing dental service within reach of the masses of people of limited means, the small wage-earner whose income barely provides subsistence and the cost of whose health maintenance is now borne by the state or by charitable institutions, is a problem pressing for adequate practical solution.

The experience gained in the conduct of dental service in municipal dispensaries and eleemosynary institutions, and above all, the experience now being gained in the dental care of those engaged in military service in the world war, will constitute an invaluable demonstration of the fact that dentistry is not primarily a luxury but a necessity; that dental service, the major objective of which is to eliminate dental and oral disease, is a different thing from the elaborate and expensive dentistry which involves the esthetic and adornment features demanded by the luxurious and well-to-do.

There is possible a dental service which, by eliminating oral disease, is a conservator of health—a service which, because it is inexpensive, should be brought within the reach of all. It has been amply demonstrated that it requires decidedly more of the taxpayers' money to maintain a retarded child an extra term in school than it does to pay for putting his mouth in a healthy condition, and when it is considered that at least a third of the re-

tarded cases are due to bad mouth conditions the economics of the case are alone ample reason for compulsory dental attention among school children.

In view of the prospective largely increased demand for dental service in the near future, steps should be actively taken to induce a larger number of qualified young men and young women to engage in dentistry as a profession. To adequately care for the dental needs of the whole population, not less than two hundred thousand dental operators would be required. The opportunities and advantages of dentistry should be brought to the attention of those who are considering their life-work, and this can best be done by the practitioner in daily contact with his *clientèle.*

The avenues of entrance into the dental profession should be made less difficult, not by any compromise in the matter of educational standards, but by the adoption of educational requirements logically adapted to securing matriculants having the best kind of training for entrance upon the professional course.

The heterogeneous character of our state laws regulating the practice of dentistry needs fundamental revision so that general reciprocity in the matter of interchange of licensure among all of the states may become an accomplished fact.

But the most important need of all is a general appreciation by the whole dental profession of the greatly enlarged field for dental service which the immediate future offers. Such an appreciation should result in an aggressive campaign having for its main object the extension of adequate dental service for the whole population, the reorganization of those features of our educational and dental legislative methods that now operate as obstacles to such general dental service, and most important of all, it should bring about the elimination of the spirit of selfish trade-unionism wherever it exists, the spirit that would artificially limit the number of practitioners in a given locality to restrict competition. The world is being remade, new social conditions are being created, and when the period of reconstruction and reorganization succeeds the present agony of conflict and slaughter the signs of the times all point to the establishment of new ideals of altruism as the dominant feature of the world's social organization. Good judgment and wisdom dictate that dentistry should even now begin to shape its activities so that they shall be in harmony with the new order.

Bibliographical

Lord Lister. By Sir Rickman P. Godlee, Bart., F.R.C.S. London, Eng.: Macmillan & Co., Lt. 1917.

With a modesty quite uncalled-for, suggesting himself in his preface as one of the band of "amateur authors," Sir Rickman Godlee has placed a wide circle of readers under contribution of thanks and gratitude. Lister was no ordinary man, and we are fortunate in having the great savant's life-work brought within the intelligence of ordinary mortals. Himself a student from first to last, the story of his life is a book that should be in the hands of every student, irrespective of age, for in it there is not only the record of infinitely patient research, resulting in the highest good to his fellowmen, but there are glimpses of an individuality of the purest integrity, coupled with a modesty and simplicity that united to form a character almost if not quite unique. The inner Lister is not completely revealed to us, though of such an actuality there is no manner of doubt—and, after all, only the high-priest has the right to enter into the holy of holies of a man's inmost soul, even though the veil of the temple has long since been torn in shreds. To his nearest and dearest, alone, did Lister in his lifetime reveal what was deepest in him, and his feelings in this matter have been admirably respected.

Lord Lister died in 1912, his life culminated yet his work never done—as was shown by notes and jottings that he evidently intended to amplify; and no doubt, in view of these, some heart-searchings must have taken place as to the greater propriety of quickly giving his history, if possible, a wider field, or of delaying publication until a clearer estimate of the full value of his life-work could be arrived at through the course of years. The opinion is respectfully ventured that the right time has been selected, and that prolonged delay in publication would have been a misfortune. Whether another biography may appear at a later date is a matter that does not concern us, but it cannot be forgotten that there are many today who remember the distinctive yet quiet personality, and are enabled through these pages to recall the living man.

It is not every biographer who can allow his subject to tell his own story, but Lister's environment and transparent honesty of heart and purpose make this a happy possibility. For the most part we are brought in close association with the master and the celebrated men of his day, and are allowed, as it were, to hear them speak, and pages full of professional cares and triumphs and family associations are little more than edited by a hand at once sympathetic and judicious. That this fascinating correspondence should appear in type so small as to be an irritation to possibly a large number of readers is a matter concerning the publisher, who has perhaps in this, as in other ways, not quite done himself justice.

It is curious to read in contemporary medical literature not only the hostility

that the enunciation of the principles of the practice of the antiseptic method produced, but the vituperation that was poured upon Lister. There have always been—there are now—men too ignorant to know and too stupid to learn, and when antiseptic surgery (not carbolic acid treatment) was born in Glasgow in the "sixties," the vials of envy, malice, and all uncharitableness were uncorked with a volubility which was only equalled by its vehemence. They meant well, those men (at least we hope so), but the irony of fate remains that their place in remembrance, not of fame, is their hostility to Lister and his system of treatment.

If the biographer has been fortunate in his subject, Lister has met a Boswell with whom knowledge and affection go hand in hand, and yet Sir Rickman Godlee, in spite of this, suffers at the hands of his "reader," to whom he generously ascribes his thanks. It will startle the Glasgow student to learn that the site of the Western Infirmary was separated from that of the University only by the river Kelvin, the fact being that both buildings are on the same side of the river. While this is a trifle, historical fact is boldly set at defiance by the statement on page 33 that Sir James Y. Simpson was the "discoverer" of chloroform. Like Lister, Simpson is one of the glories of the Scottish (not Scotch) school, and while modesty was perhaps not one of his outstanding traits, he would have, it is to be hoped, stood in uncomfortable shoes on hearing himself described as the "discoverer" of chloroform, a reagent whose anesthetic properties he had the honor to introduce to a suffering world.

What has been done by the author to enshrine the spirit of Lister is in the main admirable; the same, however, can hardly be said of the shrine. In addition to the smallness of the print in the correspondence, the paper on which the impression of this great master-mind is imprinted is poor, and the student has to put himself back into the Victorian period in having to cut the volume before its treasures can be enjoyed.

Oswald Fergus, F.R.S.
Edinburgh, Scotland.

Review of Current Dental Literature

1. [*Presse Médicale*, Paris, September 20, 1917.]

The Dental Stigmata in Congenital Syphilis. By M. Mozer and C. Chenet.

2. [*La Odontología*, Madrid, October 1917.]

A New Case of Heredo-syphilis Nerviosa. By L. Babonneix and Lorgnier.

3. [*Bulletin de l'Académie de Médicine*, Paris, 1917.]

An Alleged Dental Stigma of Congenital Syphilis. By V. Gallippe.

4. [*Bull. et Mém. de la Soc. Méd. des Hôpitaux*, Paris.]

The Fifth Cusp and Congenital Syphilis. By C. Mantoux.

5. [*Bull. et Mém. de la Soc. Méd. des Hôpitaux*, Paris.]

The Mammillary Eminence of Sabouraud: Its Clinical Significance. By G. Railliet.

6. [*Journal of the American Medical Association*, February 9, 1918.]

Syphilitic Joint Lesions Simulating Tuberculosis. By Percy W. Roberts.

7. [*Presse Médicale*, Paris, March 4, 1918.]

The Significance of the Tubercle of Carabelli. By E. Jeanselme.

The above titles represent the major part of a discussion which has grown around a statement of Sabouraud (see Dental Cosmos, July 1917, p. 759; Oct. 1917, p. 1043) that an accessory cusp on the lingual surface of the maxillary first molars is in the highest degree pathognomic of congenital syphilis.

In article 1 there were examined 60 children, who were known to be afflicted with congenital syphilis, and 1400 patients, rhachitic or tubercular, children or adults. The histories of these cases were unusually complete. The work was thoroughly done, with radiographic and serologic control.

The results are: (1) Among the congenital syphilitics Hutchinson's teeth were found 4 times: the authors observed but once the maxillary molars carrying on the anterior part of their lingual face the fifth cusp; the Wassermann in this case was strongly positive. (2) Among the other patients, in whom it was impossible to discover any recognized syphilitic taint, this fifth cusp was found clearly and unmistakably 19 times. These clinical data, verified by the laboratory, show that this new "sign" of congenital syphilis does not in reality possess any such value. This fifth cusp does not appear to have, from the point of view of syphilis, the interest attributed to it by Sabouraud.

Article 2 describes in detail a case which to the authors confirms the hypothesis of Sabouraud. It is a case of unmistakable congenital syphilis, and the dentition of the patient presents this fifth cusp. This is merely an example of coincidence, and is without value in proving the validity of Sabouraud's "sign."

Article 3 is the most extensive of the ones collected, and at the same time pre-eminently sane and judicial. It has been admirably summed up in the *Journal of the American Medical Society* as follows: Galippe devotes 41 pages to demonstrate that physicians have paid too little heed to the work of dentists, and hence when they find peculiar dental malformations in their syphilitic patients they ascribe them to syphilis. If they had wider experience with teeth they would find that to date there is no dental anomaly of shape, size, site, or structure which belongs exclusively to congenital syphilis and cannot be found with other congenital taints.

Article 4 gives the following argument: Seven tuberculous patients were found who presented clearly the fifth cusp. None of these presented in their personal or hereditary antecedents anything which could be suggestive of congenital syphilis. The most careful examination of each of them failed to reveal

a single acknowledged stigma. Five of the seven gave negative Wassermanns, while the other two gave positive. Both of these were affected with acquired syphilis. Mantoux is convinced that the fifth cusp is not a sign of congenital syphilis.

Article 5 consists of two brief notes. The first one likewise essentially appeared in *Paris Médical*, November 24, 1917. It is a consideration of the coincidences of the fifth cusp with various other oral anomalies. Railliet finds a to him impressive coincidence between the frequency of the fifth cusp and leucoplakia (out of 100 patients with the fifth cusp, 35 showed leucoplakia). The author decides that without further examination (and he is cognizant of the work of Mozer and Chanet, Mantoux, and Galippe), one cannot contradict the correctness of Sabouraud's assertion. In this he appears to forget that the novelty of the assertion places the burden of proof upon its advocates. The second note was upon a study whose material was furnished by 65 children, between three and eighteen years—18 of the 65 showing the fifth cusp. Of these 9 were without permanent teeth, and showed the fifth cusp on the maxillary second premolars. In those cases where Railliet was able to see the environment, and particularly the brothers and sisters of the little patients, it was rare that their fifth cusp did not find its justification in the family pathology. He believes that the fifth cusp represents a dystrophy, oftentimes sequent to a syphilitic ancestry.

Article 6 represents an American echo of this controversy. In a former paper (DENTAL COSMOS, Oct. 1917, p. 1037) Roberts inculpated widely-spaced incisors as a frequent anomaly most suggestive of congenital syphilis. He has become aware of Sabouraud's views, and apparently agrees with them perfectly. To the molar with the fifth cusp he assigns the very awkward and decidedly non-descriptive term "humpy molar." This is present in a large percentage of subjects with proved congenital syphilis. Moreover, it is seen on the permanent second molars, and in Roberts' series it appeared on the deciduous molars.

Article 7 is the most interesting of this group of papers. Jeanselme approaches the subject from the broad viewpoint of history and biology. Within this report is included an earlier one in the *Bulletin de l'Académie de Médecine*, Paris, 1918. The fifth cusp is clearly represented in from 17 to 20 per cent. of the population. It is represented in a less sharply defined form upon the molars of about 40 to 45 per cent. of subjects examined. It shows an hereditary tendency by apparently running in families. Among idiots, epileptics, etc., or deaf-mutes, it can be associated with other aberrations of odontogenesis, but this in Jeanselme's opinion is a pure coincidence. It was present at all times in paleolithic and neolithic man.

Twenty-three men, in whom there could be found no other "sign" of congenital syphilis than this fifth cusp, well developed, gave invariably negative Wassermanns. The author refers to the work of Collin and Souffland, who in 10 abnormal children presenting this fifth cusp found only one positive Wassermann. A second series worked over by Jeanselme may be tabulated as follows: There were 59 patients in all, of whom 21 (35 per cent.) lacked the fifth cusp, 29 (50 per cent.) had fifth cusps in a rudimentary state, and 9 (15 per cent.) had a well-developed fifth cusp. In the first group there was only one positive Wassermann; in the second group there were 5 positive Wassermanns, and in the third group not a single positive Wassermann. These data do not favor the view that the fifth cusp is an infallible indicator of a syphilitic taint.

The evil significance attached to the fifth cusp does not accord with either view as to the history of syphilis. It is as frequent in European dentures before the great epidemic recrudescence of this disease at the end of the fifteenth century, as it is now; and it is rare in pre-Columbian American skulls.

In conclusion, syphilis is definitely removed from having any influence in the production of this cusp. It is difficult to sustain the view that this cusp is the vestige of an atavistic form. Jeanselme is inclined to accept the view that it represents the remnant of the anthropoid cingulum. From this phylogenetic interpretation may be deduced the practical conclusion that the fifth cusp, the tubercle of Carabelli, is not a sign of congenital syphilis.

Considering the scanty support adduced by the adherents to Sabouraud's thesis for their views, one cannot help wondering at the attention which has been given to this subject.

All that has ever been proved by the advocates of the sinister interpretation of the fifth cusp is that this and congenital syphilis may occur in the same individual. They have even been unable to show that this coincidence is of a frequency in any way peculiar. The admirable and critical work of Mozer and Chenet, Galippe, Mantoux, and Jeanselme has incisively demonstrated that there is absolutely no causal connection between the syphilitic virus and the fifth cusp.

[*New York Medical Journal*, February 9, 1918.]

Kidney Infection as a Result of Pyorrhea. By Frank S. Crockett.

At weekly intervals the patient had temperature elevations reaching 104° F., preceded by chill. These would last one or two days, followed by several days' remission, with only a fraction of a degree rise in temperature. The urine was cloudy, and cloudy urine could be seen coming from the left ureter on cystoscopy. Immediately after removal of the kidney (which had 2 pelves and 2 ureters) the temperature fell to 99° F. and a fraction, fluctuating to normal. Some three weeks after this operation, soreness over the right kidney developed, and the temperature shot up to 104° F. The urine became loaded with pus. The teeth of the patient, who for a period of at least a year had been afflicted with pyorrhea alveolaris of moderate severity, were the most patent source of possible infection. They were promptly removed. There was a prompt remission of the fever and pain over the remaining kidney, and the disappearance of pus in the urine. The patient made an uneventful recovery.

[*British Medical Journal*, London, January 19, 1918.]

A Serological Investigation of Vincent's Angina. By F. E. Taylor and W. H. McKinstry.

Several contributors, scattered through the literature, maintain that in uncomplicated cases of Vincent's angina the Wassermann reaction is often found to be positive. This opinion is quite contrary to that of the authors, which is based on several hundred cases of sore-throat at the Queen Alexandra Military Hospital. According to their findings the Wassermann reaction is positive in syphilitic affections of the pharynx, and negative in all others with the exception of the angina of scarlet fever.

The authors had occasion to examine bacteriologically more than three hundred cases of fuso-spirillary infection, and about one-half of this number were typical cases of Vincent's angina verified by bacteriological findings. From this number there were taken at random fifty-five cases for the Wassermann. In all these cases, with but two exceptions, no fixation of complement could be observed, *i.e.* a negative Wassermann. The two positive cases admitted a syphilitic infection. The remaining fifty-three cases were quite negative. The positive reaction in the two cases admits of a ready explanation, and was not due to the fuso-spirillary infection of Vincent. In both cases the condition was one of Vincent's angina in a subject of latent syphilis.

As a result of this investigation and a careful and critical consideration of cases recorded in the literature, the authors have come to the conclusion that the prevailing belief in the occurrence of a positive Wassermann in Vincent's angina has no foundation in fact, and that the two conditions can be differentiated with absolute certainty by the application of bacteriological and serological methods; and that when the complement-fixation test of Wassermann is positive in cases of Vincent's angina, a double infection exists, either as a coincident syphilitic and Vincent's infection or as the occurrence of Vincent's angina in the subject of latent syphilis.

[*American Journal of the Medical Sciences*, Philadelphia, February 1918.]

The Pathogenesis of Infantile Scurvy: An Hypothesis. By H. J. Gerstenberger.

There are two principal lines of thought along which attempts have been made to explain the etiology of this disorder—(1) that it was the result of an infection or toxemia, and (2) that it was due to the destruction of some substance in the diet whose presence is necessary to prevent the development of the characteristic symptoms, *i.e.* absence or inaction of "vitamines," "accessory growth factors," or one of the known food constituents. The views of the present article are more closely allied to the latter concept.

Gerstenberger here offers an hypothesis, and

he makes it clear that he is doing nothing more. The hypothesis is divided into four parts: (1) All the symptoms of scurvy as we know them today may be explained on the common basis of a primary or secondary interference with one or more of the normal functions of calcium, alone or in conjunction with its physiological anion. This condition may be denominated "a partial defunctioning of calcium and its physiological anion." This first part of the hypothesis, alone, is considered to be based sufficiently on experimental and clinical data to permit its exit from the domain of pure hypothesis. (2) In infantile scurvy this defunctioning is caused by a substance produced through a break in the metabolism of carbohydrates, whatever their original source may be. (3) The break in carbohydrate metabolism occurs as a result of the absence or inactivity or relative insufficiency or inadequacy of some physico-chemical substance or "vitamine" essential to the establishment and performance of normal carbohydrate metabolism. This view has already been advanced by other investigators. (4) The defunctioning substance produced as a result of the break in the metabolism of carbohydrates due to a disproportionment between the carbohydrate supply on the one hand and the "vitamine" supply on the other possibly is oxalic acid, or some other agent that has a similarly strong affinity for calcium and that after combining with calcium is soluble with similarly great difficulty.

The second and third parts of the hypothesis are considered to have as a basis experimental and clinical data that are distinctly suggestive, while the fourth is still purely hypothetical, although on its assumption it is possible to explain satisfactorily some of the clinical phenomena of scurvy that hitherto have not even had a hypothetical explanation.

The interference with normal calcium metabolism is indicated by the increased permeability of the vessel walls and the osseous lesions in scurvy. There is a close connection between the severity of the bloodvessel lesions on the one hand and of their proximity to the bones on the other. "This is most beautifully demonstrated by the lesions occurring in the gums only when the teeth are erupting or have erupted; in other words, at a time when the alveolar periosteum is very active, and when the gums have become firmly attached at the neck of the tooth to the tooth and to the periosteum."

[*Journal of Laboratory and Clinical Medicine*, St. Louis, December 1917.]

An Experimental Study of Root-filled Teeth: Preliminary Report. By M. B. Cohen.

That root-canal filling in average hands does not eradicate periapical infection is shown by the following study of six cases of polyarthritis:

Sixty-two cultures were made from "locked areas" beyond the apices of eighteen teeth which had been filled from six months to twenty years previously. Growth was obtained without exception from each of the sixty-two cultures on some one of the media used. The organisms usually isolated were those found normally in the mouth. The streptococcus viridans was the predominating one; it occurred in sixty cultures. The staphylococcus family was represented in sixteen, always in association with the streptococcus, while the colon bacillus was isolated in pure culture once. One culture yielded B. acidophilus.

[*Medical Record*, New York, January 26, 1918.]

Streptococcus Oral Sepsis: Complement-Fixation Test and Value of Routine Blood Examinations. By N. B. Potter, A. McNeil, and S. Bradbury.

This study represents a much-needed step in the right direction. For a long time we have been morally certain that oral sepsis was an important factor in more general disturbances, but the careful analyses of this relationship have been all too few. The present report is not only founded upon data afforded by the most painstaking and strictest procedures of laboratory science, but also—and this fact lends them peculiar value—controlled by long-continued clinical observation.

The first part of this paper deals with the particular problem, Is it possible to demonstrate the presence of immune substances (called forth in response to the irritation of streptococci of oral foci) in the blood of persons suffering from various types of systemic disturbance which are suspected of being me-

tastatic from oral foci? The principle of this interrogation is quite analogous to that underlying the well-known and reliable test for syphilis.

The technique used in making these tests was identical with that of the classical Wassermann test, excepting that an antigen prepared from several varieties of streptococci was used. The strains of streptococci from which the antigen was prepared were obtained from clinical cases showing widely varying conditions of streptococcic infection. Complement-fixation tests were carried out on about eighty patients, as indicated clinically.

Twenty-one of these cases have been very carefully followed up for two years or more, and have largely recovered or very decidedly improved, due, the authors believe, to the elimination of a definite focus of chronic infection, usually in the teeth or tonsils. The authors are convinced of the preponderating importance in etiology and treatment of these minor streptococcic infections in many serious conditions or chronic invalidism.

Even with an imperfect antigen, the results of a complement-fixation test for streptococci in the oral sepsis complicating or causing many forms of chronic invalidism support in general the clinical evidence of the etiological, prophylactic, and therapeutic importance of this organism, and emphasize the desirability of further attempts along this line to assist diagnosis.

The second part of this paper reports the results of routine blood examinations in pertinent cases. Of fifty-five carefully studied cases of oral sepsis, twenty-five were selected for analysis. The others were excluded because of some important pathological condition other than oral sepsis. The only suggestive feature exhibited by a routine examination of the blood is a high normal lymphocyte percentage, which, however, is certainly no more striking than in any collections of patients who consult a physician for some minor ailment.

[*Journal of the American Medical Association*, February 9, 1918.]

Paget's Disease of the Bone. By Robert Abbe.

The author had two purposes in making this report: (1) To call attention to the admirable repair of such diseased bones when surgical operation is called for, and (2) to direct attention to its not infrequent occurrence in the jaw-bones, in order that it may not come unrecognized under the notice of dentists.

The essential condition of this disease is one of very chronic osteitis, productive of spongy overgrowth, with absorption of the compact structures in the long bones, and occasional development of cysts lined with epithelium, sometimes filled by fluid or granulation tissue.

In fourteen private cases four showed involvement of the jaws. In two of these, extensive surgical operation was required, and most excellent results were obtained.

Two such cases are described.

Case 1. Female, whose lower jaw had been treated for a cyst on several occasions for twenty-two years. A roentgenogram showed a very thick skull, typical of Paget's disease. Abbe extensively removed the outer plate, and all the cancellous and cystic structure of the forward half of one side of the lower jaw, leaving the inner compact structure.

Case 2. Male, for many years a victim of an enormous and repulsive overgrowth of the alveolar roof of the mouth. Roentgenoscopy showed the large characteristic overgrowth of the calvarium. A horizontal block of bone, more than one inch thick, was removed.

Both of these cases illustrate the very slow development of the disease.

[*British Dental Journal*, December 15, 1917.]

Bismuth Poisoning as Affecting the Oral Cavity. By Fred. J. Blight.

A somewhat analogous case is Freilich's—see the Dental Cosmos, 1917, p. 466. Bismuth paste (probably bismuth subnitrate, iodoform, and paraffin liquid) had been used in treatment of a comminuted fracture of the left forearm. Within a week the gums of the patient became painful. About three weeks later a bright blue line extending around the gingival margin of both maxillary and mandibular teeth was discovered. On examination the mouth showed a condition of ulcerative stomatitis. The teeth were slightly loose; some recession of the gums had occurred. The blue discoloration, which was found on both palatal and buccal surfaces

of the gingivæ, was entirely absent in places where teeth had been lost.

Before the wound the patient had been a fairly robust man, aged thirty-nine, with a clean, healthy mouth, but evidently with an idiosyncrasy to bismuth poisoning.

Removal of the bismuth dressing resulted in recovery.

[*Bulletin de l'Académie de Médicine*, Paris, 1917, No. 43.]

Senility of the Dental Tissues Among Soldiers. By J. C. Demarquette.

Senility is accompanied by a mineralization, more and more accentuated. It is externally manifested by a modification of the color of the tooth, which becomes more and more opaque, and at the same time becomes yellow or bluish. Another very important effect of senility is seen in the course of dental extractions, where the elasticity of the osseous tissues of the jaws is lost. This change is to be inferred from a much heightened incidence of fractures of the alveolar borders during extractions. A third effect of this senility is that the roots and the teeth in general, although much harder, are also much more brittle.

The author has noticed a comparable senility of dental tissues among those who have dwelt in the tropics.

These symptoms of senility are very manifest in the army. The men of the young classes ('11, '12, '13, '14), who have been at the front three years, have dental and osseous tissues in the same state as those of men from thirty to forty years of age, in normal times. The author suggests that this senility may be attributed to fatigues, prolonged exposure to the rigors of the weather, rations too rich in nitrogen and alcohol and too poor in fresh vegetables, and perhaps to the action of neurotoxins produced by violent emotions.

Periscope

Zinc Dies with Zinc Counters.—I should like again to repeat my conviction of the efficiency of zinc counterdies. They can be quickly poured on to very hot zinc dies without any coating, provided that the molten zinc is just beginning to crystallize, and no adhesion will take place. Having used no lead or tin counters for many years, I have no hesitation in again recommending this quick and efficient method to my colleagues. —H. J. Morris, *British Dental Journal.*

To Obtain Smooth Castings.—Excrescences on inlays are a common trouble, but I have found that by casting with a rapidly falling temperature a smooth skin is obtained, provided they are carefully invested. I melt and boil the gold with a gas and oxygen or gas and nitrous oxid flame, and flux it with borax and nitrate of potash. It then has a creamy color, and moves rapidly under the intense heat. Now the flame is withdrawn and movement ceases, and after waiting a few seconds the casting is made. I have invariably by this method obtained a smooth skin for my inlays.—H. J. Morris, *British Dental Journal.*

Keeping Matrix Bands.—A convenient method in which to keep matrix bands after receiving them from the dental dealer is to remove them from the original package, sterilize, and put them in a bottle of oil of eucalyptol, thymol, and menthol; then cut a groove in the side of the cork, and drain off the surplus, and they will be sterile and ready for instant use. Replace a solid cork when through draining. Having them in a bottle you can see what you want.—Y. E. Whitmore, *Dental Review.*

Apothesine.—Apothesine is similar in its behavior and in its action to novocain. It is a little quicker, perhaps, in its action, and gives as perfect anesthesia as novocain. This drug can be bought in tablets of different strengths, and can be used with adrenalin or without it. It can be dissolved either in Ringer's solution or in normal salt solution, and if necessary the desired amount of adrenalin may be added at the time the solution is made. This will give us just as good, if not better, results than we have obtained in the past from novocain.—Louis Schultz, *Dental Review.*

Full Upper Dentures on a Gold Base.—In making these it is not necessary or even desirable to extend the metal far over the highest part of the ridge, because a vulcanite rim will better exclude the air and promote the necessary adhesion.

The real strength of these dentures being in the vulcanite mounting, a very thin gold plate can be used, say No. 6 B. M. gage, and this can be easily swaged on one zinc die, having a zinc counter. So we secure ample strength together with a minimum of weight, gold, and thickness, and the thinner the base the easier it is for the patient to obtain a good adhesion, and the more comfortable the denture.

All upper dentures, especially full cases, should have their posterior edges turned up by means of a groove in the model. This gives a tighter fit, and greatly helps the patient to retain the piece in place.—H. J. Morris, *British Dental Journal.*

Chlorcosane Apparently the Ideal Solvent for Dichloramine-T.—Chlorcosane is a straw-colored, odorless, tasteless liquid, made by chlorinating hard paraffin wax, by a process enabling it to take up from 45 to 55 per cent. of pure chlorin. Being in itself non-irritant and making a very stable solution, it seems to be the ideal solvent for dichloramine-T. To prepare a five per cent. solution ready for use, all that is necessary is to dissolve 50 grains of dichloramine-T in two ounces of the chlorcosane. In preparing the solution the antiseptic dissolves quite slowly in this oil, but this difficulty is easily overcome if about one-fourth of the oil is taken and warmed to about 80° C. (156° F.), before adding the dichloramine-T. In this warm oil the dichloramine-T dissolves readily with a little stirring or agitation. When this solution has been made, add the remaining three-fourths of the chlorcosane. If the solution is not reasonably clear, filter it through a fluted filter paper.—*Helpful Hints.*

Amalgam Fillings.—Amalgam is the most used and the most abused tooth-filling material. The practice of merely cleaning out a cavity and inserting a large pellet of amalgam is too common, and must be condemned. Amalgam fillings for proper insertion require as much care and nearly as much time as gold fillings, are often their equal for service and saving the tooth, and when properly inserted and finished are fillings of beauty. One is constantly seeing amalgam fillings inserted in teeth in which there has been poor cavity preparation and no attempt at anatomical restoration of the tooth, with poorly mixed alloy and without the use of a matrix.

The teeth in which amalgam should be used are especially the bicuspids and molars; these teeth are sometimes so badly decayed and broken down that amalgam is the only material with which to fill and restore them to usefulness; sometimes it is the only material that can be used to save a tooth from being extracted.—C. H. Woolgar, *Dental Summary.*

Dental Treatment for Mothers.—Dr. J. Francis Taylor, the medical officer of health for Leyton, Eng., reports that the infant welfare and antenatal clinics are making rapid strides in popularity. Attendances and results are most satisfactory, but he suggests that in order to develop their usefulness an extension is advisable in the direction of providing dental treatment for actual and prospective mothers. It is found that the health of the mothers is seriously prejudiced by the presence of decaying teeth, which act as septic foci from which toxins are absorbed into the blood, and these have been proved to affect injuriously the unborn infant and also the milk of the nursing mother. There is already a dental clinic for school children, with a dentist and nurse conducting the work, and he suggests that arrangements should be made for two sessions at the antenatal clinic. Dr. Taylor would administer the necessary anesthetics, as he does in the case of the school children. The total expenditure, excepting a small sum for fillings, would not exceed £125 per annum, one-half of which would be payable by the Local Government Board. Dr. Taylor predicts that incalculable benefit would be conferred on the mothers and infants by this modest outlay. The health committee has agreed to this proposal.—*British Dental Journal.*

Determining the Length of the Bite.—Each case of denture construction is a law unto itself, and no rule of averages, be it ever so inclusive, can possibly supplant or adequately supply the specific demands arising in the individual case. The rule that the length of the teeth should be established in accordance with the lips when in position of repose is no less impractical than is the rule of establishing the occlusal plane.

The misleading feature of this rule, by which we are supposed to determine the length of the teeth, is due entirely to the fact that the rule does not conform to the conditions imposed in nature. When the

muscles controlling mandibular movements are in a state of rest the lips normally are extended to their full length. The muscles controlling mandibular movements are not constantly contracted—nature could not tolerate a constant contraction of these muscles—and in their unfunctionating state the mandible hangs down to the extent of relaxation of the suspending muscles and tendons, and the teeth are not normally in occlusion. The reverse of this normal repose in lip position would be found when the teeth are occluded and the lips are compressed and much shortened. It is my idea that the latter position of the lips more nearly indicates the length of the bite when the teeth are in occlusion than does the position of the lips when the muscles are relaxed and at rest.—RUPERT E. HALL. *Dental Review.*

What to Expect and What Not to Expect from a Radiograph.—A radiograph will not tell whether a tooth is vital or devitalized unless the root is filled, or there is an apical infection or apical abscess. Some root-fillings are transparent to the radiograph, and therefore the roots appear unfilled. But even in such cases it has been found that filling materials of this character, or most of them, anyhow, are not good root-canal fillings, and it is advisable to replace them with something better, such as rosin and chloroform and gutta-percha, or chloro-percha and gutta-percha, pushing the chloro-percha through the apex.

Don't expect every radiograph to show whether a filling does or does not encroach upon the pulp. Sometimes the angle from which it is taken will make it appear that it does, and sometimes that it does not.

An X-ray will not show all apical infections. There may be apical infections in which the bone has not been destroyed. Do not expect the X-ray to show all fistulous tracts. Sometimes it will and sometimes it will not.

Unless two and sometimes three radiographs at different angles are taken, all the roots of the upper first or second molar will not be shown clearly. Unless two or more radiographs at different angles are taken, do not expect a radiograph to show whether or not a root is perforated.

Radiographs are supposed to show foreign bodies in the teeth and jaws, such as metal fillings, pieces of fillings, gutta-percha, pieces of cement, broaches, missing or forgotten roots, misplaced or fractured teeth, and cysts. When wires are placed in the root-canals it will show how far these are accessible, the curvature of the root, and the best means of access. Also remember that chloro-percha and gutta-percha are the best root-fillings so far devised, because they may be pushed through the apical foramen without danger if aseptic precautions have been taken; also they will show clearly and distinctly in the radiograph.—A. M. NODINE, *Dental Summary.*

Dental Dispensary of Omaha.—The Free Dental Dispensary of Omaha has just rounded out the first year of its existence. The dispensary committee submits the following report of the work accomplished during the week of February 14th to 21st, the last week of the first year of its operation. This week is typical of others:

Examinations	52
Extractions	112
Amalgam fillings	156
Cement fillings	99
Silver nitrate treatments	4
Treatments	72
Prophylaxis	34
Anesthetics:	
Local	1
Nitrous oxid	9
Postoperative treatments	7
Orthodontia (return cases)	15
X-rays taken	3
Referred to free medical dispensary	3
Individual health talks	62
"Lavender Cross" button given	32
Toothbrushes, tubes of paste	18

The report demonstrates very clearly the two distinct aims of the dispensary:

(1) That the mouth and teeth of each child who presents himself for service be given the treatment that will make him a cleaner, healthier child, thus giving him a fair chance in life. This is made possible by the dentists who donate a part of their time to work on the teeth of these children.

(2) That each child receives the instructions necessary to keep his mouth in good, clean condition, and that he be made to realize the importance of "Clean Teeth—Good Health."

For this educational phase of the work we depend on our office secretary, who explains the value of mouth hygiene, and presents each child with his toothbrush and his "Lavender Cross" button. Toothbrush drills are given to the children in public schools by the school nurses.

By each one doing his bit this institution is constantly turning out better boys and girls for Omaha.—*Omaha World-Herald.*

Technique for Cleaning and Filling Root-canals.—Having isolated a tooth and cleansed the surrounding tissues, the canals are then to be cleaned. A small broach is passed into the canal as a finder, measuring the approximate distance to an obstruction, and a fine Kerr root-canal reamer is used to open it as far as possible. This is followed by a medium-sized reamer of the same type, then a Kerr file is used—all of which takes only a short time, if proper care is used not to twist off the ends of such delicate instruments. After this the canal is ready for filling.

The use of cotton on broaches for drying canals should be avoided, as all débris can be removed and the canal cleansed as previously stated. The very nature of the cotton, and the practical impossibility of keeping the hands clean during such an operation, render the use of cotton on broaches just prior to placing the root-filling in position very dangerous, and, in fact, a rather slovenly method. A small glass tray with a glass top should be used to hold the canal points, which should always be immersed in alcohol, and, just prior to use, a few points placed on the edge of the tray to dry before insertion into the canal, the canal being dried by the use of the electric canal dryer, or in the absence of this instrument, a hot blast from a chip-blower will suffice. The canal is then moistened with eucalyptol and either chloro-percha or euca-percha compound is used and pumped into the canal, as far as is possible. This is followed by canal points, and instead of a root-canal plugger I use a short broach, and force this into the mass until it is soft, and if possible get a response from the patient, after which a larger point is used, the end cut off and burnished over the opening, and I have every reason to believe my work will prove satisfactory.—J. K. Conroy, *Dental Review.*

Advantages of Clasped Dentures.—(1) Cheapness of construction as compared with other forms of attachment for removable bridge work; (2) the absence of necessity for immediate destruction of tooth substance; (3) less strain upon supporting natural teeth.

The principal objection to clasps, of course, lies in the possible future destruction of tooth substance, but, viewed from all aspects, is it not the manifest duty of prosthodontists to apply at least some of their talents to the improvement of a class of work and a type of denture which is less expensive and more generally useful?

Cannot we now construct a clasp with the minimum of risk to the tooth which it encircles, and would it not be equally as permissible to cut a cavity and protect with a gold filling or inlay the surface which the clasp is to touch, as it is to remove a pulp and destroy a quarter or a half of a tooth, as is done for some styles of bridge work? Indeed, is it not time for a renaissance of clasp construction? I think it is.

After many years of keen observation, and after having utilized almost every form of attachment known to the profession, I now and here want to make a plea for a more general use of clasps in the construction of all forms of partial dentures, and wish to support this plea with this statement: I believe that a good clasp used where indicated, and well adapted to the supporting tooth, will in the long run do less injury, both in the way of destructive influence upon tooth structure and in the subsequent loosening of the tooth, as a whole, from stress and strain, than any other form of attachment now at our command.

That the full scope of advantages and possibilities may obtain, however, it is of course necessary, first, that clasps should be used only when indicated; second, that all of the requirements of a clasp must be observed to the fullest extent; and third, that the form must be favorable, and the adaptation to the supporting tooth good.—Hart J. Goslee, *Dental Items of Interest.*

Anatomical Occlusion and Articulation in Artificial Dentures.—To secure this condition means that the artificial teeth should be so formed and arranged that they will occlude and articulate without undue interferences, balance and support the dentures against displacement under the stress of the forces of incision and mastication, guide the co-ordinating muscles in directing the movements of the mandible, and at the same time, in the positions or relations of articulation, provide spaces for food.

Teeth may be anatomically arranged by having an articulator capable of imitating all of the movements of incision and mastication of the mandible, and then have these movements under such control that we may utilize them for the perfect positioning and grinding of the teeth in anatomical relations as guided by esthetics, by the alveolar ridges, and the movements of the articulator.

Present teaching and practices are now wrong: (1) Because of faulty methods and articulators; (2) because the cusps of the teeth now upon the market are not long enough to permit meshing or interlocking so that in movements of the mandible they will reach and maintain contacts with their antagonists, provide adequate spaces for food,

and balance the dentures under the stress of the forces of mastication.

Teeth with deep angular cusps (guiding angle 45°), correctly arranged, balance the vertical and lateral or horizontal movements of the mandible, as typical to nature when in the stage of greatest efficiency; also definitely guide the co-ordinating muscles in directing the movements of the mandible, also typical to nature; provide spaces for food; balance and support the dentures in the process of incision and mastication against movements from their basal seat; and in case of displacement of the dentures, steady and guide their return to their normal position —comparable with the guiding and supporting influence of the rails of the railway track upon the railway coach, the rails the lower teeth (high cusps), and the wheels, their flanges (long cusps), the upper teeth. The train without the flanges upon its wheels to secure and guide its movements upon the rails (movements of the mandible in the case of a masticatory apparatus) would leave the track, not travel its intended course, and be a failure. Likewise may we justly and logically regard the principles involving the construction and uses of artificial dentures if we are to expect them to perform the function of incision and mastication efficiently, and not be failures.—RUPERT E. HALL, *Dental Review*.

OBITUARY

Dr. Isaac Howard Davis.

[SEE FRONTISPIECE.]

DIED, at his home in Baltimore, Md., Friday, February 8, 1918, in his fifty-ninth year, ISAAC HOWARD DAVIS, M.D., D.D.S.

Dr. Davis was born at Dickenson, Montgomery county, Md., September 4, 1859, the seventh son of Isaac and Catharine (Miles) Davis. His grandfather came to America from Wales, and settled in Pennsylvania.

His early education was obtained in the county schools, where he afterward taught for four years before entering the University of Maryland to pursue his study for his medical and dental degrees. He was graduated with honors from both the dental and medical departments of the university in 1884 and 1885 respectively. Immediately following his graduation in medicine in 1885 he was made demonstrator of operative dentistry in the infirmary of the university, and at the same time began the practice of dentistry in Baltimore.

From the time of his graduation to the time of his death, a span of thirty-three years, Dr. Davis' participation in the affairs of his alma mater never ceased. From demonstrator of operative dentistry he was successively charged with the responsibility of associate professor of operative dentistry, professor of orthodontia, and in 1909 was made professor of operative dentistry to succeed the late Prof. James H. Harris. All the duties accompanying the responsibility of these positions of importance were faithfully performed, even at times to his physical and financial detriment.

Dr. Davis' death marks the passing of the group who knew the dental department of the university from its founding to the present day. He entered its first class, and remained faithful to its progress and assisted it in every way possible. His last act was to lecture to the present senior class. Upon this occasion he sustained a fall which resulted in the condition ending in his death.

His love for the university was the dominant inspiration of his life. The betterment of the institution came before his individual interest, causing him to give unstintingly and unselfishly of his time and efforts, impairing his health and sacrificing personal gain in his endeavor to uplift the profession and build in his alma mater the future for his cherished dreams. A highly successful teacher, he was one by nature; master of his subject, clear, logical, penetrating in his presentation, and second to none in equipping his classes to meet the duties of their chosen profession.

Always of a spiritual trend of mind, he anticipated the ministry, but having abandoned the idea, the influence pervaded his entire life. He felt his mission among the

students to be a sacred one, while the character and uplift of the boys was a subject of real concern. His influence, as he wished it to be, was an unconscious one, preferring to typify by his life and embody in his actions the ideals he wished them to pursue. "He was nature's priest, and by the 'vision splendid' Was on his way attended."

Dr. Lyman Curtis Bryan.

Died, at Lausanne, Switzerland, Monday, February 4, 1918, after a long and painful illness, in his sixty-fifth year, Lyman Curtis Bryan, D.D.S.

Dr. Bryan was born on November 5, 1852, in Kentucky, U. S. A., and received his education at the University of Tennessee, Nashville, Tenn. He began the study of medicine and dentistry in 1876, later entering the Boston Dental College, from which institution he was graduated in 1880. Immediately after graduation, Dr. Bryan was made demonstrator of operative and clinical dentistry in the Boston Dental College.

In 1881, Dr. Bryan went to Basle, Switzerland, and established himself in the practice of dentistry, succeeding to the practices of Drs. Wright and Elliott, two prominent dentists of Basle. Dr. Bryan was highly successful in his practice, and attained considerable renown in the dental profession both in Switzerland and Germany.

He was an honorary member of the National Dental Association. He was an active member and at one time president of the following associations: The American Dental Association of Switzerland, Southwestern Section of the Central Society of American Dentists, Dental Association of Basle, and the European Advisory Board Association. In the year 1904 Dr. Bryan was honorary president for Switzerland of the Fourth International Dental Congress, which was held in St. Louis, Mo.

Dr. Bryan was throughout his career quite active in dental affairs, and made numerous contributions to the literature of dentistry. In the year 1909 he left Basle because of ill health, and went to Montreux with the intention of retiring to private life. Through business misfortune, however, Dr. Bryan found himself at the age of sixty years compelled to again take up active work. He thereupon recommenced the practice of dentistry in Montreux, which he continued until about a year ago.

Dr. Bryan was married in 1883 to Miss Isabell S. Atwood, who for thirty-six years was in joy and sorrow his true and faithful wife.

The funeral services were held at the Montoie Cemetery, Lausanne, Switzerland, Wednesday, February 6, 1918, where his remains were interred.

Dr. Wm. Mortimer Zirkle.

Died, Sunday, December 23, 1917, in Atlanta, Ga., following an operation for appendicitis, in his fifty-fifth year, William Mortimer Zirkle, D.D.S.

Dr. Zirkle was born at New Market, Va., in October 1863, the son of Caspar and Kate (Wendell) Zirkle. He obtained his early education in the public schools of Virginia, and began the study of dentistry in 1897 at the Southern Dental College, Atlanta, Ga., from which institution he was graduated in the year 1900. Dr. Zirkle, immediately on graduation, established himself in the practice of dentistry in Atlanta, Ga., and continued to practice there until the time of his death.

The death of Dr. Zirkle will bring a sense of keenest sadness to his hosts of personal and professional friends throughout the South.

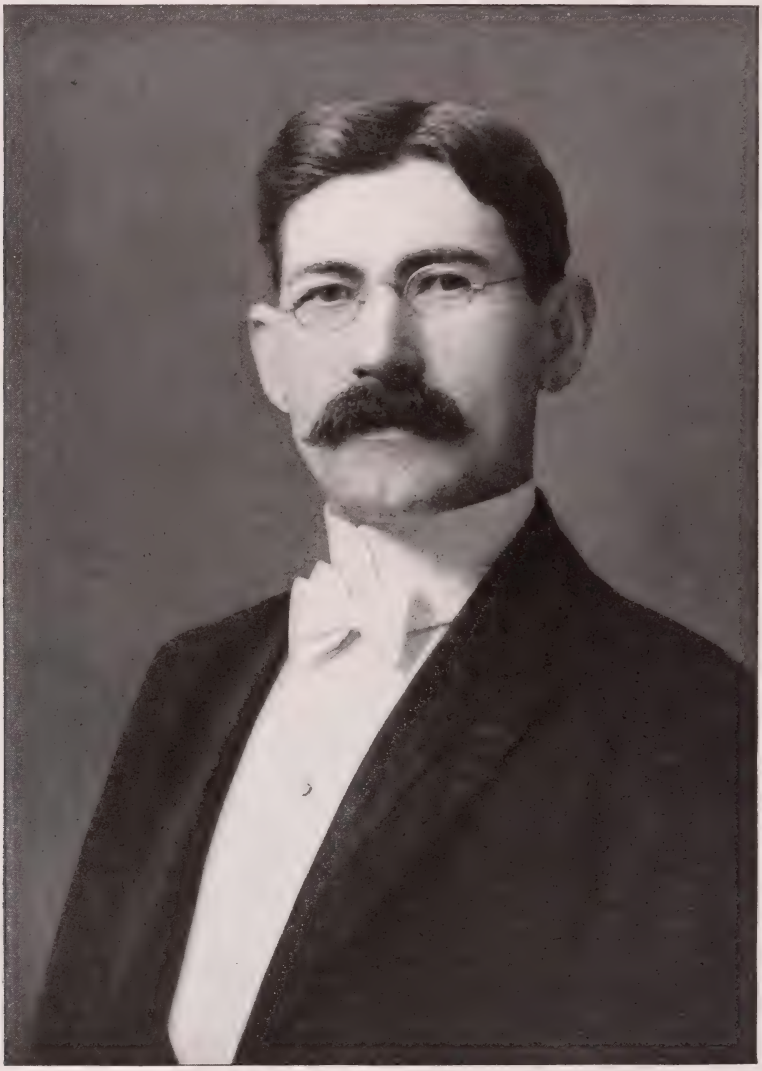
Having labored long and earnestly to benefit humanity, and to do all in his power to elevate the dental profession, his physical strength commenced to ebb two years ago. His intimate friends feared it was the beginning of the end, and while, from time to time, he partially resumed his professional duties, he realized that the strain had been too great.

Though very retiring in his manner, and never seeking the recognition which was his just due on account of personal and professional attainments, he was for years a member of the faculty of the Southern Dental College, and at the time of his death was treasurer of the Georgia State Dental Society and a member of the Board of Dental Examiners for the State of Georgia. The Atlanta Society of Dental Surgeons was organized in 1905 at his suggestion, and he served as its first president. These positions he filled with

credit to himself and with honor to his chosen profession, and here as in every other department of his activities exemplified his sterling integrity and his professional attainments.

His death is a distinct loss to the dental profession in his city, his state, and the South.

Dr. Zirkle was married to Miss Carrie Brannan of Andersonville, Ga., who, with one son, Dr. Clyde B. Zirkle, survives him.



DR. WM. MORTIMER ZIRKLE.

He was an active member of the Masonic bodies from the Blue Lodge to the Shrine, and by his genial personality inspired confidence and affection in the hearts of all with whom he came in contact.

The funeral services were held from his late home on December 24th, and interment took place in the Westview Cemetery, Atlanta, Ga.

DeLos L. Hill.

Army and Navy Dental News

Proposed Legislation.

Army Medical Department.

Senate Bill 4168.

Senator Shields has introduced a bill (S. 4168) regulating and fixing the rank and compensation of the commissioned officers of the Medical corps and of the Medical Reserve corps of the army while in active service. It provides as follows:

That the Medical department of the army shall consist of one surgeon-general with the rank of major-general, who shall be chief of said department; six assistant surgeons-general, the assistant surgeons-general to be equally distributed in the grades of major-general and brigadier-general; the medical corps; the medical reserve corps; the dental corps; the dental reserve corps; the veterinary corps; the veterinary reserve corps; the commissioned officers of which shall be citizens of the United States; the nurse corps and contract surgeons authorized by law; the enlisted force of the medical department of the army, and the medical enlisted reserve corps, as now provided by law.

Commissioned officers of the medical corps below the rank of brigadier-general shall be proportionately distributed in the several grades as now provided by law.

The commissioned officers of the medical reserve corps shall be distributed in the several grades as in the medical corps of the army.

In time of war the President shall have authority to appoint in the grade of consultant, to be equally distributed in the grades of major-general and brigadier-general, such number of officers of the medical reserve corps as the interests of the service may demand: *Provided*, That reserve officers so appointed shall at no time exceed twenty in number.

Nothing in this act shall be held or construed so as to discharge any officer of the regular army or deprive him of a commission which he now holds therein.

Transfer to Medical Corps from Medical Reserve.

Proposed Legislation.

Representative Dyer proposes to amend the National Defense Act so as to provide for transfer from the Reserve to Medical corps:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled:

That hereafter the President shall be authorized to fill any vacancies that may occur in the commissioned *personnel* of the Medical department of the army of the United States by ordering such officers of the medical section, officers' reserve corps, and dental reserve corps, who shall have been in active service one year or more, to the army medical school or army dental school under such rules and regulations as shall be prescribed by the Secretary of War; and such officers so ordered, upon completion and satisfactory examination shall be commissioned first lieutenants in the Medical department, United States army, and be entitled to all the pay, promotion, and allowances of officers of like rank in the army of the United States, except that the rate of retirement shall be one-thirtieth of the present retirement pay as now prescribed by law for each year's active service as an enlisted man, contract surgeon, or as a commissioned officer in the army of the United States, medical section, officers' reserve corps, medical reserve corps, dental reserve corps, or organized militia in federal service: *Provided*, That at the age now prescribed by law for retirement every officer to be so commissioned shall have had not less than fifteen years' active service in any of the branches enumerated in this act: *Provided further*, That preference for appointment shall be given to those who have had the longest aggregate active service in the branches enumerated in this act.—*Army and Navy Register.*

Against Medical Corps Legislation.

The War department is against the enactment of the Senate bill (3748) fixing the grades of the commissioned *personnel* of the Medical corps and the Medical Reserve corps of the army. The acting Secretary of War regards the proposed legislation as "highly undesirable," and has urged that it "be not favorably considered." Assuming that the number of medical officers on active duty will soon reach 70,000, Mr. Crowell states that "This would provide for 100 general officers, 800 colonels, 1600 lieut.-colonels, and 17,500 officers in the lower grades." "The number of officers in the higher grades provided by this proposed legislation would be far in excess of the number authorized for service with troops, and would give greatly increased rank to officers serving with non-combatant troops over those serving with combatant forces, which is manifestly contrary to the prevailing views as to what is equitable and right." Attention is also called by Mr. Crowell to the fact that "All other sections of the reserve corps of the army limit the highest grade to that of major, and to include the medical reserve corps of the army in this proposed legislation would result in not only the abnormal and unwarranted promotions, but would give officers of the medical section of the reserve corps higher grades than provided for any other section of the reserve corps, which would be a manifest injustice."—*Army and Navy Register.*

Army Medical Department.

Vacancies in the Dental Corps.

While nothing official has yet been vouchsafed in regard to the decision of the War department as to the total enlisted strength of the army which is to be the basis of the commissioned *personnel* of the Medical department of the regular establishment, it is understood that the ruling, which may be expected during the coming week, will announce this total enlisted strength as 286,000. There will be, accordingly, an excess of colonels and lieutenant-colonels, owing to the fact that the numbers in those grades as now existing were based on a strength of 300,000. The excess number will, of course, have to be absorbed, but as there are a number of retirements in prospect during the next few months the situation will not be a difficult one to adjust. There are now 883 officers in the Medical department, including those who have been recently recommended for appointment, and on the basis of the prescribed total of 1000 vacancies to be filled. The Dental corps, now consisting of 209 officers, is entitled to some 90 more in view of the fact that the *personnel* of that branch is founded on the total strength of the army estimated at 300,000 instead of the total enlisted strength. In the examination which was recently held, the results of which are to be made known in the next few weeks, it was announced that the candidates found qualified would be afforded the opportunity of appointment to the restricted degree of not more than three or four vacancies. A large number of candidates had previously applied for the privilege of taking the examination, and when it became known that the vacancies were so few in number many of them declined to enter the competition. Since then, it is promised, there have arisen nearly 100 vacancies to be filled, and probably there will be much discontent expressed when it is known that there were a larger number of vacancies than was at one time in prospect.—*Army and Navy Register.*

Additional Dentists for Divisions.

Authority has been given by the War department for increase of the allowance of dental *personnel* for the divisions about to depart for France. Such divisions will have 31 dental officers and 32 enlisted men as dentists' assistants, in place of the former allowance of 25 of each class. The allowance of dental officers as prescribed by law for the regular army is one per 1000 of the regular commissioned and enlisted *personnel* of the line and staff, and this ratio has been maintained in placing members of the dental reserve corps and of the dental corps of the national army on active service. The dentists —basing their estimates on the average in private practice—are advocating an allowance of three dental officers per 1000 of the *personnel* of the military establishment. The allowance of 31 dental officers to an overseas division gives less than two per 1000. A new class of recently appointed members of the regular dental corps and of the dental reserve corps commenced a two months' course of instruction at Fort Oglethorpe, Ga., on April 15th.—*Army and Navy Register.*

Competition in Training Camps.

Efficiency Records.

It is proposed to hold a dental efficiency record competition between the different training camps, based upon: The amount and class of dental treatment administered, dental study clubs, societies or meetings held, conduct of dental officers, such as moral or physical fitness; personal qualifications, such as neatness of appearance and social con-

duct among other officers; the equipment of dental operating rooms and care of same, or any other data on the general efficiency of the camps.

A questionnaire will be submitted by the executive council of the Association of Military Dental Surgeons for the division surgeon to fill out, and from these reports the executive council will select the winner. The winning camp will be given a banner with a suitable inscription.

Initiative on the part of the dental officers in camp in making the best suggestions, making the best of what they have, getting what is necessary and obtainable from the medical and quartermaster's corps, will also be considered—so it behooves the dental officers in camp to get busy.

The division surgeon will be invited to officiate, and note the above-mentioned points.—*Journ. Assoc. Military Dental Surg. U. S.*

Naval Student Reservists.

INSTRUCTIONS have been issued by the bureau of navigation to call to active duty those naval reservists now in an inactive status in order to continue courses at college. These men will be assigned to duty at the completion of the current school year, the only exceptions being medical and dental students who are enrolled in the hospital corps reserve, and who will not be called to duty this year until one year after graduation, as it is believed that during that year they will acquire valuable professional experience in civil life. Undergraduate medical and dental students will not be called out, as many schools are continuing their course through the vacation period, and undergraduates will doubtless want to accept internships in hospitals which have been depleted owing to the war. Graduate students of other colleges will be retained on active duty; undergraduates will be given training during the vacation period, and may again be released to resume their studies next fall. Graduates who are called to duty will be examined with a view to determining their fitness for the various officer schools, especially graduates of technical schools. Undergraduates will also be examined for these schools, but if they enter the officer school or qualify for commission, they forfeit their privilege of returning to college. Undergraduates will be assigned to recruit training, and later will be placed in the patrol forces of the several naval districts. —*Army and Navy Register.*

Dental Service in the British Navy.

THE army dental service by reason of its numbers commands the greater share of our attention, but that the navy also has its difficulties must not be overlooked. The fact that dental surgeons serving afloat are duly commissioned officers, while their colleagues ashore are only civilians, has been brought before Parliament on several occasions during the past three years, and we are glad to learn is at last to be remedied by the granting of commissions in the Royal Naval Volunteer Reserve to all dental surgeons so employed. This we look upon as only a prelude to the granting of commissions on the strength of the royal navy, and to the establishment of a Royal Naval Dental Service. Naval dental surgeons tell us that the seamen's mouths are as much neglected and need as much attention as those of the British Tommy. We believe that the bluejacket is quite keen to have his teeth attended to, but that he is not very addicted to the use of the toothbrush which forms part of his kit. The denture work of the navy seems to need centralization, and arrangements should be made for the rapid supply and repair of dentures during the brief periods when the ships are in port. If this is not done, a useless expenditure of time and money takes place, owing to the sudden departure of ships and men from their harbors. —*Brit. Dental Journal.*

Work Done by the Canadian Army Dental Corps.

DENTAL OPERATIONS PERFORMED BY OFFICERS OF THE CANADIAN ARMY DENTAL CORPS IN ENGLAND AND FRANCE, FROM OCTOBER 1 TO DECEMBER 31, 1917; ALSO GRAND TOTAL OF WORK COMPLETED SINCE JULY 15, 1915.

Total operations reported to—	Fillings.	Treatments.	Dentures.	Prophylaxis.	Extractions.	Devitalizing.	Total.
September 30, 1917 ...	478,279	155,461	94,206	67,106	340,395	51,891	1,187,158
October 31, 1917 ...	26,176	13,723	4,488	8,917	12,326	2,333	67,963
November 30, 1917 ...	27,163	14,169	4,613	5,470	10,948	2,342	64,705
December 31, 1917 ...	22,752	12,779	3,831	5,230	9,045	2,166	55,803
Total	554,370	196,132	106,958	86,723	372,714	58,732	1,375,629

HEADQUARTERS C. A. D. C.,
133 Oxford st., London.

J. ALEX. ARMSTRONG, *Col.*,
Director of Dental Services, O. M. F. of Can.

An Unusual War Injury.

In a recent issue of the *British Medical Journal*, Mr. Gordon Taylor of the Middlesex Hospital records a most interesting case. During the battle of the Somme a soldier was buried in his shelter by a large shell. He was dug out from among the débris in an unconscious state, and ultimately placed on a hospital barge, and thus conveyed to the base. When he recovered consciousness on the barge, one of his first requests was for the artificial toothplate which he had been wearing when he was rendered unconscious by the shell explosion. The denture—an upper one—was produced from his wallet by the attendant orderly, but the patient, remarking its size and the number of teeth, quickly declared his doubt as to its being his, or if it were, he assured those in attendance that it must have been broken, and that part of it was missing.

The patient had also shown some signs of a fracture of the skull, and to this was ascribed the difficulty in swallowing of which he complained. No radiogram was apparently taken, and he was speedily evacuated to England, and admitted into one of the auxiliary military hospitals at Eastbourne. The man's story led to an investigation of the denture, which showed clear evidence of having been fractured across its palatal and alveolar portions. Examination with the screen revealed the presence of a foreign body in the thorax, and an X-ray plate showed a denture with two teeth opposite the middle piece of the sternum. The use of Brüning's œsophagoscope fitted with a Hill's tube made it possible to obtain a good view of the offending denture, and it was easily extracted *per vias naturales* by means of an Irwin Moore's forceps.

The case is of interest in that a fracture of an upper dental plate was produced without any injury of the superior maxilla. Such an experience as this is interesting and valuable, in civil as well as in military practice. The unfortunate aspect of the case is the length of time which elapsed before the patient came under the skilled care of Mr. Gordon Taylor. It emphasizes the value of routine X-ray examination of all doubtful cases.—*Brit. Dental Journal.*

Personnel of Medical Department.

For the week ending March 8, 1918, the *personnel* of the medical department of the army included—

Medical Corps: 796, including 1 major-general, 66 colonels, 102 lieut.-colonels, 177 majors, 2 captains, and 448 lieutenants.

Medical Reserve Corps: 17,654, including 1069 majors, 4063 captains, and 12,522 lieutenants; on active duty 14,283, including 942 majors, 3492 captains, and 9849 lieutenants. Medical Corps National Guard: 1243, including 11 lieut.-colonels, 257 majors, 149 captains and 826 lieutenants. Medical Corps, National Army: 70, including 4 brigadier-generals, 12 colonels, 49 lieut.-colonels, and 5 majors.

Dental Corps, 211. *Dental Reserve Corps*, 5114, of whom 1334 are on active duty. *Dental Corps National Guard*, 260.

Veterinary Corps, 24. *Veterinary Reserve Corps*, 1400, of whom 781 are on active duty. *Veterinary Corps National Army*, 294.

Sanitary Corps, 940, and *Ambulance Service*, 138, constitute the remainder of the commissioned *personnel.—Journ. A. M. A.*

Promotions.

Dental Reserve Corps.

The following appointments (promotions) are announced (March 30th):

To be Majors: 1st Lieuts. Earl C. Braniger, Henry W. Rich, and Guy P. Bannister.

To be Captains: 1st Lieuts. John P. Garriott, Jesse L. Meredith, Alphonse L. Senecal, William V. Thomson, Thomas M. Terry, Smith C. Tanner, Walter F. Clayton, Robert H. Nones, Jr., and Royal E. Wight.

Announced April 6th:

To be Captains: 1st Lieuts. Perry Haskell Plummer, Kenneth F. Smith, Austin R. Killian, John C. Gallagher, and Frank W. Gale.

Announced April 13th:

To be Captains: 1st Lieuts. James B. Davidson, Arthur Lankford, John F. Ackley, Rae P. McGee, Wm. C. Speakman, Stewart D. Ruggles, Gerald G. Burns, Harry B. Butler, Gregory P. Cassidy, James L. Clements, Roscoe L. Barber, George A. Hewey, Ozias Paquin, Jr., Nathaniel Barnard, Leonard G. Mitchell, Edward E. P. Sleppy, Frank D. Pierce, Robert R. Luce, Frank P. Gormley, John J. W. Ross, and Ivan E. Smith.

Assignments.

Army Dental Corps.

Week ending March 23d.

Major Rich'd B. Clark from duty in Hawaiian department to San Francisco.

The following from present duties to Fort Oglethorpe for duty as instructors: Majors Ben H. Sherrard and E. Henry Valentine.

The following to Fort Oglethorpe for course of instruction: Major Thomas L. Smith, 1st Lieuts. Alvin E. Anthony, Leslie D. Baskin,

Jacob L. Brause, Arthur T. Burchill, Albert S. Cumming, Frederick C. Daniels, Alvin D. Danheisser, Benjamin H. Dean, James E. Dean, Chester Denham, Melvin R. Eiche, Harold S. Embree, Raymond H. Fisher, Jerome L. Fritzsche, Dell S. Gray, Leroy P. Hartley, Wm. H. Hoblitzell, Henry L. Hogan, Avery G. Holmes, Clarence R. Jacobson, George R. Kennebeck, Hooker O. Lindsay, Lewis W. Maly, James B. Manning, Neil J. McCollum, Roy R. Newman, James H. O'Reilly, Harold J. Parker, Adrian C. Ragan, Fletcher D. Rhodes, Fernando T. Rodriguez, Walter A. Rose, John A. Rowe, Roy C. Starr, Eugene A. Smith, Wm. B. Stewart, Robert L. Strickland, Richard F. Thompson, Lynn H. Tingay, and Walter D. Vail.

Week ending March 30th.

Col. Wm. H. Chambers from duty at Presidio of San Francisco to Fort McPherson, general hospital 6, for temporary duty.

Week ending April 13th.

Col. Wm. H. Chambers from duty at Presidio of San Francisco to Fort McPherson, general hospital, for duty.

Col. Julian R. Bernheim to report to Surgeon-general for duty in his office.

Leave for three months granted Maj. J. Craig King on surgeon's certificate.

1st Lieut. Wm. F. Wieck to Fort Oglethorpe for course of instruction.

Dental Reserve Corps.

Week ending March 23d.

Capt. Fred Tiesse, Jr., to Washington, 50th infantry camp, East Potomac Park, for duty.

The following to Fort Oglethorpe for course of instruction: Capt. Floyd E. West, 1st Lieuts. Guy P. Bannister, Wm. R. Beattie, Albert J. T. Beatty, Francis A. Boylan, Wm. Z. Carroll, Walter T. Clark, John F. Connolly, Donald D. Cornell, Thomas Crenshaw, Jr., James G. Crutchfield, Charles E. Davis, Joseph D. Eby, George H. Elliot, Max C. Frazier, Walton J. Graft, James F. Hannon, Edger T. Haynes, James H. Keith, Floyd D. Leach, Edward B. Lodge, Jerome B. Marshall, Walter F. Neuhoff, Arthur H. Nobbs, Henry W. Rich, George E. Roland, Wm. J. Stark, Roy A. Stout, Wm. V. Thomson, Harry M. Trafford, Raymond L. White and Walter L. Wilson.

Week ending March 30th.

Capt. Walter Sorenson to Fort McHenry, Md., general hospital 2, for duty.

A WAR NEED OF THE GOVERNMENT.

Stenographers and Typists Wanted—Men and Women.

UNITED STATES CIVIL SERVICE EXAMINATIONS.

THE United States Government is in urgent need of thousands of typewriter operators and stenographers and typists. All who pass examinations for the departments and offices at Washington, D. C., are assured of certification for appointment. It is the manifest duty of citizens with this special knowledge to use it at this time where it will be of most value to the Government. Women especially are urged to undertake this office work. Those who have not the required training are encouraged to undergo instruction at once.

EXAMINATIONS for the Departmental Service, for both men and women, are held every Tuesday in 450 of the principal cities of the United States, and applications may be filed with the Commission at Washington, D. C., at any time.

The entrance salary ranges from $1000 to $1200 a year. Advancement of capable employees to higher salaries is reasonably rapid.

Applicants must have reached their eighteenth birthday on the date of the examination.

For full information in regard to the scope and character of the examination and for application blanks address the U. S. Civil Service Commission, Washington, D. C.; or the Secretary of the U. S. Civil Service Board of Examiners at Boston, Mass.; New York, N. Y.; Philadelphia, Pa.; Atlanta, Ga.; Cincinnati, Ohio; Chicago, Ill.; St. Paul, Minn.; St. Louis, Mo.; New Orleans, La.; Seattle, Wash.; San Francisco, Cal.; Honolulu, Hawaii; or San Juan, Porto Rico.

JOHN A. MCILHENNY,
President U. S. Civil Service Commission,
WASHINGTON, D. C.

Preparedness League of American Dentists.

ORGANIZED UNDER THE AUSPICES OF THE N. D. A.

THE DENTAL COMMITTEE OF THE GENERAL MEDICAL BOARD, WHICH IS THE AGENCY FOR THE MEDICAL AND DENTAL PREPAREDNESS IN THIS WAR EMERGENCY, HAS MADE IT POSSIBLE FOR EVERY DENTIST IN THE UNITED STATES TO ASSIST IN THE WORK, UNDER THE SUPERVISION OF LIEUT. WM. A. HECKARD, D.R.C., U.S.A., STATIONED AT 50 EAST 42D ST., NEW YORK, N. Y.

Preparedness League Notes and News.

By R. OTTOLENGUI, *Publicity Committee.*

REPORT FROM THE PRESIDENT.

OUR NEXT MOVE.

We do not want members of the League to get the idea that the great drive now going on to help make our National Army dentally fit is the sole object of our organization. It is but one of a series of our activities. The development of our dental motor car is a signal illustration of the great possibilities before us.

Those of us who are not commissioned, and who continue in civil practice, must devote our energies to preparing to give expert services to our soldiers who have been injured in battle. We will find ourselves in need of all the skill we can summon, therefore I would impress upon our members the great advantage of forming sectional units of the League throughout the whole country for the study of war oral and dental surgery. We are proud to say that our dental reserve is overfilled, and service in that direction is amply provided for. However, if later on more are needed, the study course will the better prepare us. I therefore strongly urge the promotion of this object, and point with pride to the splendid record the League has already made in that direction. More than one hundred sectional units have given such a course, which has been the means of assisting several hundred to pass examinations to the Reserve corps, as well as promoting their advancement to higher commissions and positions in the service.

"Knowledge is power," and is the best weapon at our command to overcome the results of disaster. It is our duty to marshal our forces as rapidly as possible for this object, as already our boys are beginning to return sadly in need of our best service, and the great battle which has been fought will bring thousands upon thousands to whom we must minister. Every dentist, whether or not a member of the League, should make this a personal matter, and if not near a League unit, interest himself in forming one in his neighborhood, and we will gladly supply all information and give the needed assistance.

Awaken to this call and put your shoulder to the wheel, otherwise *you may realize later that you have not done all you might have done for your country.* By communicating with the office of the president, 131 Allen st., Buffalo, N. Y., we will give you full instruction as to the procedure.

LECTURE AND SLIDES.

The League has prepared a synopsis lecture accompanied by slides showing cases of Plastic and Oral Surgery before and after treatment, a series covering our Free Dental Activities, and a third, showing our new Dental Motor Car.

Twenty-five sets have been distributed to different state directors for use by sectional units of the League and all other societies. We urge their use at state society meetings. The laity, also, will be interested. Assignments may be made by your state director or through the office of the president, 131 Allen st., Buffalo, N. Y.

IMPORTANT NOTICE.

It has come to the attention of the President of the League that a pamphlet is being circulated advising our members to charge selective service men who are able to pay for the service necessary to make them dentally fit.

This pamphlet is *spurious,* and the originators deserve no better treatment than in-

ternment during the war as cohorts of the Kaiser. It is but another vain attempt to abort the principles upon which the League is founded, and which will live for ages after the perpetrators of this un-American and despicable subterfuge have become naught but a blotch of mold upon our fair soil and the unfairly acquired gain has been dissipated without benefit to themselves or their families.

I trust all loyal dentists will exert themselves to give this stigma the lie by strictly adhering to the only principle that can make our organization live and be of vital importance to humanity and our country in this great crisis.

J. W. BEACH, *President.*

REPORT FROM THE DIRECTOR-GENERAL.

* * * * *

DENTAL REQUIREMENTS AND EMERGENCY WORK.

There seems to be a misunderstanding on the part of some as to what the dental requirements are to fit a man for general military service. He must have six opposing incisors and six opposing masticating teeth (either bicuspids or molars). These bicuspids or molars may be all on one side or part on each side, but there must be at least three above and three below, each of which must touch some tooth on the opposite jaw.

The most important thing to do for these men is to rid their mouths of bad roots and infected teeth, or any tooth having a history of periodical abscess. After the mouths are freed from infection and the gums healed, plates can be made by members of the League who desire to do so, or they can be made after reaching the cantonments, if the officer in charge deems it necessary. The mouths, however, must *first* be made free from infection. Then, if possible, any large cavities in the remaining teeth should be filled and the teeth cleaned.

The lack of the minimum number of teeth (six and six) does not excuse any man from *military* service, but only from general military service. The man who has less teeth than the minimum required for *general* military service can be accepted (if otherwise fit) for limited military service, even if he has *no* teeth. These men for limited military service will cook food, drive wagons and auto trucks, carry supplies, work in factories, shops, or storehouses, etc.

CHAS. F. ASH, *Director-general.*

All ethical dentists who are not yet members of the PREPAREDNESS LEAGUE *are earnestly requested to fill out the Application Blank below and mail to the Treasurer,* DR. L. M. WAUGH, *with $1.00 membership fee.*

APPLICATION BLANK

TO THE

Preparedness League of American Dentists.

Being an ethical dentist, I hereby make application for ACTIVE MEMBERSHIP in the Preparedness League of American Dentists, which entitles me to all the benefits and privileges of the organization.

Enclosed find $1.00 (One Dollar) membership fee, including official button. No dues or assessments.

Signed.....

Please write name and address plainly. .....

(Inclose professional card.) .....

MAKE CHECK PAYABLE TO L. M. WAUGH, 576 Fifth Ave., New York City.

SOCIETY NOTES AND ANNOUNCEMENTS

NOTICES should reach the Office of the DENTAL COSMOS *not later* than the 11th or 12th of the month preceding that of publication.

Coming Dental Society Meetings.

National.

NATIONAL DENTAL ASSOCIATION. Chicago. August 5th to 9th.

NATIONAL ASSOCIATION OF DENTAL FACULTIES. Chicago. August 2d and 3d.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS. Chicago.

AMERICAN SOCIETY OF ORTHODONTISTS. Chicago. August 1st to 3d.

ASSOCIATION OF MILITARY DENTAL SURGEONS. Chicago.

DELTA SIGMA DELTA FRATERNITY. Chicago. August 5th.

PSI OMEGA FRATERNITY—NATIONAL ALUMNI CHAPTER. Chicago. August 5th.

XI PSI PHI FRATERNITY. Chicago.

State Meetings.

MAY.

EASTERN ASSOCIATION OF GRADUATES OF THE ANGLE SCHOOL OF ORTHODONTIA. New York City. May 6th and 7th.

ILLINOIS STATE DENTAL ASSOCIATION. Bloomington. May 14th to 17th.

INDIANA STATE DENTAL SOCIETY. Indianapolis. May 21st to 23d.

IOWA STATE DENTAL SOCIETY. Des Moines. May 7th to 9th.

MASSACHUSETTS DENTAL SOCIETY. Boston. May 1st to 3d.

NEBRASKA STATE DENTAL SOCIETY. Lincoln. May 20th to 23d.

NORTH DAKOTA DENTAL SOCIETY. Grand Forks. May 21st and 22d.

JUNE.

AMERICAN MEDICAL ASSOCIATION—SECTION ON STOMATOLOGY. Chicago. June 11th to 14th.

COLORADO STATE DENTAL SOCIETY. Estes Park. June 20th to 22d.

FLORIDA STATE DENTAL SOCIETY. Atlantic Beach. June 20th to 22d.

"FOUR STATES" POSTGRADUATE MEETING [ALABAMA, MISSISSIPPI, TEXAS, AND LOUISIANA]. New Orleans. June 3d to 6th.

GEORGIA STATE DENTAL SOCIETY. Atlanta. June 12th to 14th.

KENTUCKY STATE DENTAL ASSOCIATION. Lexington. June 13th to 15th.

MAINE DENTAL SOCIETY. Portland. June 26th to 28th.

NEW YORK STATE DENTAL SOCIETY. Saratoga Springs. June 13th to 15th.

NORTH CAROLINA DENTAL SOCIETY. Wilmington. June 19th to 21st.

NORTHEASTERN MASSACHUSETTS DENTAL SOCIETY. Swampscott. June 26th and 27th.

NORTHERN OHIO DENTAL ASSOCIATION. Toledo. June 6th to 8th.

SOUTH CAROLINA STATE DENTAL ASSOCIATION. Columbia. June 27th to 29th.

TENNESSEE STATE DENTAL ASSOCIATION. Nashville. June 17th to 19th.

WASHINGTON STATE DENTAL SOCIETY. Spokane. June 27th to 29th.

WYOMING STATE DENTAL SOCIETY. Thermopolis. June 10th.

JULY.

CALIFORNIA STATE DENTAL ASSOCIATION. San Francisco. July 8th to 13th.

INTERSTATE DENTAL ASSOCIATION. (Col'd.) Buckroe Beach, Va. July 10th to 12th.

NEW JERSEY STATE DENTAL SOCIETY. Atlantic City. July 17th to 19th.

Examiners' Meetings.

CALIFORNIA BOARD OF EXAMINERS. San Francisco, May 23d; Los Angeles, June 10th.

CONNECTICUT DENTAL COMMISSIONERS. Hartford. June 20th to 22d.

INDIANA BOARD OF EXAMINERS. Indianapolis. June 17th to 22d.

IOWA BOARD OF EXAMINERS. Iowa City. June 3d.

MAINE BOARD OF EXAMINERS. Augusta. July 1st.

MARYLAND BOARD OF EXAMINERS. Baltimore. May 30th and 31st.

MASSACHUSETTS BOARD OF EXAMINERS. Boston. June 22d to 29th.

MICHIGAN BOARD OF EXAMINERS. Ann Arbor. June 17th to 22d.

MISSISSIPPI BOARD OF EXAMINERS. Jackson. June 18th.

NEW JERSEY BOARD OF REGISTRATION. Trenton. June 24th to 28th.

NORTH CAROLINA BOARD OF EXAMINERS. Wilmington. June 17th.

PENNSYLVANIA BOARD OF EXAMINERS. Philadelphia and Pittsburgh. June 12th to 15th.

RHODE ISLAND BOARD OF REGISTRATION. Providence. June 18th to 20th.

SOUTH CAROLINA BOARD OF EXAMINERS. Columbia. June 24th.

SOUTH DAKOTA BOARD OF EXAMINERS. Sioux Falls. July 1st.

TEXAS BOARD OF EXAMINERS. San Antonio. June 17th.

WASHINGTON BOARD OF EXAMINERS. Seattle. May 30th to June 5th.

WISCONSIN BOARD OF EXAMINERS. Milwaukee. June 17th.

Baltimore College of Dental Surgery.

CLASS OF 1913.

WILL the members of the above class kindly communicate to the president of the class their present address?—that he may write them in reference to class reunion to be held in the near future, *i.e.* May or June; also expressing opinion as to their preference of date.

A. L. CAIRNS,
1378 Beacon st., Brookline, Mass.
H. W. DOREMUS,
Orange and Seventh sts., Newark, N. J.

Delta Sigma Delta Fraternity.

THE thirty-fourth annual meeting of the Supreme Chapter of Delta Sigma Delta Fraternity will be held in the Florentine Room of the Congress Hotel, Chicago, on Monday, August 5, 1918, at 9 A.M.

The regular order of business will be pursued, to be followed by initiatory exercises in the afternoon.

Headquarters of the Fraternity will be at the same hotel, at which place the annual banquet will also be held in the evening in the Gold Room. Those expecting to attend the banquet will greatly facilitate the work of the Dinner Committee by notifying them at once.

By order of the Supreme Chapter.

HY. W. MORGAN, *Supreme Gr. Master.*
R. HAMILL D. SWING, *Supreme Scribe.*

American Society of Orthodontists.

THE eighteenth annual meeting of the American Society of Orthodontists will be held August 1, 2, and 3, 1918, at the Edgewater Beach Hotel, Chicago, Ill.

This will be an excellent meeting. It is advisable to make your reservations early.

F. M. CASTO, *Sec'y,*
Rose Bldg., Cleveland, Ohio.

National Association of Dental Faculties.

THE next annual meeting of the National Association of Dental Faculties will be held in the Green room of the Congress Hotel, Chicago, Ill., August 2, 1918, at noon. The Executive Committee will meet at 10 A.M. on the 2d. The meeting will continue through August 3d.

CHAS. C. ALLEN, *Sec'y,*
N. W. cor. 10th and Troost, Kansas City, Mo.

North Dakota State Dental Association.

THE North Dakota State Dental Association will hold their annual meeting at Grand Forks, N. D., May 21 and 22, 1918.

ALBERT HALLENBERG, *President,*
Fargo, N. D.
SOLON CRUM, *Sec'y,*
Fargo, N. D.

Eastern Association of Graduates of the Angle School.

THE annual meeting of the Eastern Association of Graduates of the Angle School of Orthodontia will be held at the Hotel Vanderbilt, New York City, on Monday and Tuesday, May 6 and 7, 1918.

FREDERIC T. MURLLESS, JR., *President,*
Hartford, Conn.
E. SANTLEY BUTLER, *Sec'y,*
576 Fifth ave., New York City.

Massachusetts Dental Society.

THE fifty-fourth annual meeting of the Massachusetts Dental Society will be held in Boston, Mass., on Wednesday, Thursday, and Friday, May 1, 2, and 3, 1918, at the Massachusetts Charitable Mechanic Association Building on Huntington ave.

WALDO E. BOARDMAN,
Ch'man Ex. Com.
J. ARTHUR FURBISH, *Sec'y*,
400 Marlboro st., Boston, Mass.

Iowa State Dental Society.

THE fifty-sixth annual meeting of the Iowa State Dental Society will be held in Des Moines, Iowa, May 7, 8, and 9, 1918. An excellent program has been prepared, including seminars, papers, and clinics. A cordial invitation is extended ethical members of the profession from out of the state to attend any or all of these sessions.

E. R. SWANK, *Sec'y*, Panora, Iowa.

Illinois State Dental Society.

THE fifty-fourth annual meeting of the Illinois State Dental Society will be held at Bloomington, Ill., May 14, 15, 16, and 17, 1918.

J. E. HINKINS, *Pres.*, Chicago, Ill.
J. P. LUTHRINGER, *Sec'y*, Peoria, Ill.

North Carolina Dental Society.

THE North Carolina Dental Society will meet on June 19 to 21, 1918. Headquarters, Oceanic Hotel, Wilmington, N. C.

W. T. MARTIN, *Sec'y*,

Northern Ohio Dental Association.

THE annual meeting of the Northern Ohio Dental Association will be held June 6, 7, and 8, 1918, at Toledo, Ohio.

C. H. CLARK, *Sec'y*, Youngstown, Ohio.

Northwestern University Dental School.

THE Northwestern University Dental School Alumni Association will hold the annual Home-coming Clinic, 31 W. Lake st., Chicago, Ill., on June 10 and 11, 1918. Special features have been provided which will insure a successful and interesting meeting. Make your arrangements now.

M. M. PRINTZ, *Sec'y*,
4235 Lake Park ave., Chicago.

American Medical Association.

Section on Stomatology.

Following is the program for the American Medical Association, Section on Stomatology, for the meeting to be held in Chicago, June 11 to 14, 1918:

Chairman's Address. Dr. Frederick B. Noyes, Chicago.

(1) "Chancre of the Lip Following Injury with Dentist's Emery Disk." Dr. Adelbert M. Moody, Chicago.

(2) "An Analysis of Two Hundred Cases of Malignant Diseases in the Oral Cavity by Electro-thermic Methods, or in Combination with Operative Surgery, X-rays, or Radium." Dr. Wm. L. Clark, Philadelphia, Pa.

(3) "Treatment of Epithelioma of the Jaws and Cheek with Heat and Radium." Dr. Gordon B. New, Rochester, Minn.

Discussion—Dr. Albert T. Ochsner, Chicago, Ill.

(4) "The Lipoids of Tumors of the Dental System." Dr. Kaethe W. Dewey, Chicago, Ill.

(5) "The Genesis of the Epithelial Débris in the Peridental Membrane, Nasmyth's Membrane, and the Granular Layer of Tomes." Dr. Eugene S. Talbot, Chicago, Ill.

(6) "Additional Roentgenographic Studies of Infections of the Maxillary Bones." Dr. Arthur D. Black, Chicago, Ill.

(7) "Microscopic Studies of Diseased Peridental Tissues, Illustrated by Stereopticon." Dr. Edward H. Hatton, Chicago, Ill.

(8) "Absorption of the Roots of Teeth." Dr. Herbert A. Potts, Chicago, Ill.

(9) "Neuralgia Dentalis." Dr. Kurt H. Thoma, Boston, Mass.

(10) "Longitudinal and Transverse Sectional Views of the Accessory Sinuses of the Human Cranium, Cut Parallel, and at Right Angles to the Nasal Septum." Dr. Geo. Edward Fell, Chicago, Ill.

(11) "Fractures of the Bones of the Face, with Complication." Dr. Vida Latham, Chicago, Ill.

(12) "Fractures and Dislocations of the Jaws." Dr. Chalmers J. Lyons, Ann Arbor, Mich.

(13) "A New Surgical Procedure for Operating in Cases of Suppurative Gingivitis with Alveolar Involvement." Dr. Arthur Zentler, New York City, N. Y.

The officers of the section cordially invite those who are interested in the program to be present, and to take part in the discussions.

FREDERICK B. NOYES, *Chairman*,
EUGENE S. TALBOT, *Sec'y*.

Dental Society of the State of New York.

THE fiftieth anniversary of the Dental Society of the State of New York will be held at Saratoga Springs, N. Y., June 13, 14, and 15, 1918. The society will endeavor to present a literary, clinic, and social program for the benefit of the profession, in keeping with its golden anniversary. A cordial invitation is extended to all members of the National Dental Association. For further information write

A. P. BURKHART, *Sec'y*,
52 Genesee st., Auburn, N. Y.

Georgia State Dental Society.

THE semi-centennial meeting of the Georgia State Dental Society will be held in Atlanta, Ga., June 12, 13, and 14, 1918, when this society will celebrate its fiftieth anniversary.

Florida State Dental Society.

THE Florida State Dental Society will hold its next annual meeting at the Atlantic Beach Hotel, Atlantic Beach, Fla., on June 20, 21, and 22, 1918, where fishing, golfing, and surf bathing is unsurpassed.

A fine program is being planned. All ethical practitioners of this and other states invited.

For further particulars address

D. D. CREWS, *Sec'y*,
Fort Myers, Fla.

Maine Dental Society.

THE fifty-third anniversary meeting of the Maine Dental Society will be held in the City-hall, Portland, Me., June 26 to 28, 1918.

I. E. PENDLETON, *Sec'y*,
Lewiston, Me.

Northeastern Massachusetts Dental Society.

THE annual meeting of the Northeastern Massachusetts Dental Society will be held at the New Ocean House, Swampscott, Mass., Wednesday and Thursday, June 26th and 27th. Finest hotel on the North Shore. All ethical members of the profession are cordially invited. Hotel rates one-half: $5.00 per day.

HOWARTH STANSFIELD,
70 Merrimac st., Haverhill, Mass.

Postgraduate Dental Meeting:

Alabama—Mississippi—Texas—Louisiana.

(1) *Place of meeting.* New Orleans, at the Grunewald Hotel.

(2) *Date.* To avoid interfering with dental college exercises and dental examining board meetings, and to be assured of pleasant weather, June 3, 4, 5, and 6 were selected.

(3) In order to give each member an equal opportunity to get all that is possible and not congest the meeting the membership will be limited to 350 members.

(4) Membership cards will be issued only to members in good standing in their state dental societies, and to dentists in the army and navy dental corps.

(5) The registration books will be closed May 27th (one week before the meeting) to all except members of the army and navy dental corps.

(6) *Fee.* Owing to increased cost of postage and stationery and all other expenses, the membership fee to the general meeting will be ten dollars for each member. Special courses following the general meeting, fifteen dollars for each course per member.

(7) No one will be issued a special course card unless he has registered for the general meeting.

The subjects chosen to be taught at the next meeting will be as follows:

"Nerve Blocking." Dr. Arthur E. Smith, Chicago.

"Technique of Root-canal Preparation, Treatment, and Filling." Dr. Elmer S. Best, Minneapolis.

"Full Upper and Lower Dentures." Dr. Rupert E. Hall, Chicago.

"Exodontia." (Instructor to be selected.)

General Chairman—J. J. Sarrazin, 424 Godchaux Bldg., New Orleans, chairman Committee on Interstate Relations.

General Secretary—Leo C. Dempsey, 943 Jackson ave., New Orleans.

Ask yourself the question, Can I afford to miss this meeting? Send your application for membership to the Four States Postgraduate meeting, with your check for ten dollars, to your state chairman for indorsement and transmission by him to Dr. L. C. Dempsey, the general secretary. Members of the Louisiana State Dental Society can apply direct to Dr. Dempsey with membership fee inclosed.

J. P. WAHL, *Ch'man Publicity Com.*,
1135 Maison Blanche, New Orleans, La.

Tennessee State Dental Association.

THE fifty-first annual meeting of the Tennessee State Dental Association will be held in Nashville, Tenn., June 17, 18, and 19, 1918.

GEO. L. POWERS, *Sec'y*,
Paris, Tenn.

South Carolina State Dental Association.

THE annual meeting of the South Carolina State Dental Association will be held at the Jefferson Hotel, Columbia, S. C., June 27, 28, and 29, 1918.

W. BUSEY SIMMONS, *President*.
ERNEST C. DYE, *Sec'y*.

Kentucky State Dental Association.

THE next annual meeting of the Kentucky State Dental Association will be held at Lexington, Ky., June 13, 14, and 15, 1918. An "amalgam program" of special interest.

Address all correspondence to

W. M. RANDALL, *Sec'y*,
1035 Second St., Louisville, Ky.

Washington State Dental Society.

THE Washington State Dental Society will hold its next meeting in Spokane, Wash., June 27, 28, and 29, 1918.

A. STARKE OLIVER, *President*,
FRANK B. LYNOTT, *Sec'y*,
249 Peyton Bldg., Spokane, Wash.

New Jersey State Dental Society.

THE forty-eighth annual convention of the New Jersey State Dental Society will be held on July 17, 18, and 19, 1918, on Young's Million Dollar Pier, Atlantic City, N. J.

The entire convention will be held on the pier. Machinery Hall will be used for the exhibits. Those who attended last year will remember the magnificent display of dental goods, and Dr. S. I. Callahan of Woodstown, N. J., chairman of the Exhibit Committee, with 25,000 square feet of space, has promised an exhibit greater than that of 1917.

The Essay Committee under the direction of Dr. C. M. F. Egel of Westfield, will present two or three essayists of prominence —names and subjects to be announced.

All meetings for the presentation of papers as well as the business meetings will be held in the Greek Temple, out on the pier.

The headquarters of the society will be at the pier entrance. Mail may be directed to exhibitors, clinicians, or members in care of the Secretary New Jersey State Dental Society, Young's Million Dollar Pier.

A cordial invitation is extended to ethical practitioners.

JOHN C. FORSYTH, *Sec'y*,
430 E. State St., Trenton, N. J.

California State Dental Association.

THE California State Dental Association will hold its regular annual session for the year 1918 in San Francisco, July 8 to 13, 1918.

We will conduct our meeting this year on the Oklahoma plan, and feel that we can assure all who attend a pleasant as well as a profitable meeting. Further information may be obtained by addressing

JOHN E. GURLEY, *Sec'y*,
350 Post st., San Francisco.

Texas Board of Examiners.

THE next regular examination of the Texas State Board of Dental Examiners will be held in San Antonio, Texas, beginning June 17, 1918, at 9 A.M. No diplomas exchanged; no reciprocity.

The application fee of $25 should be in the hands of the secretary not later than June 12th. For further particulars and application blanks address

HARRISON B. CAVE, *Sec'y*,
810-14 Wilson Bldg., Dallas, Texas.

Massachusetts Board of Examiners.

A MEETING of the Massachusetts Board of Dental Examiners will be held in Boston, Mass., June 22 to June 29, inclusive, 1918, for the examination of candidates for registration. All applications must be in the hands of the secretary on or before June 13th. For further information address

GEORGE H. PAYNE, *Sec'y*,
29 Commonwealth ave., Boston, Mass.

Connecticut Dental Commission.

THE Dental Commissioners of Connecticut will meet at Hartford, June 20, 21, and 22, 1918, to examine applicants for license to practice dentistry, to examine applicants for dental hygienist's license, and to transact any other business proper to come before them. For blanks and further information, address

EDWARD EBERLE, *Recorder*,
902 Main st., Hartford, Conn.

Washington Board of Examiners.

THE Washington State Board of Dental Examiners will hold their next meeting at Seattle, Wash., May 30 to June 5, 1918. Address all communications to

FRANK B. LYNOTT, *Sec'y*,
249 Peyton Bldg., Spokane, Wash.

Maryland Board of Examiners.

THE Maryland State Board of Dental Examiners will meet for examination of candidates for certificates in Baltimore, on May 30 and 31, 1918, at the Dental Department of the University of Maryland at 9 A.M.

For application blanks or further information apply to

F. F. DREW, *Sec'y*,
701 N. Howard st., Baltimore, Md.

California Board of Examiners.

THE next examination by the Board of Dental Examiners of California for a license to practice dentistry in that state will be held in the City of San Francisco, beginning on the 23d day of May 1918, at 9 A.M.

This examination will be followed by an examination in Los Angeles, beginning on the 10th day of June 1918, at 9 A.M.

All applications for examination must be filed with the board on the morning of the day set for beginning the examination (May 23d in San Francisco and June 10th in Los Angeles). Each application must be accompanied by the fee of $25, necessary credentials (diploma and license from other states, testimonials of good moral character), and a recent unmounted photograph of the applicant.

By order of the Board of Dental Examiners of California.

C. A. HERRICK, *Sec'y*,
133 Geary st., San Francisco.

Mississippi Board of Examiners.

THE Mississippi Board of Dental Examiners will hold its next annual meeting at the State Capitol building in Jackson, on the third Tuesday in June 1918, at 8 A.M. Fee for examination $10. Diploma from recognized school and certificate of moral character required. No reciprocity or interchange. For further information, address

B. J. MARSHALL, *Sec'y*,
Marks, Miss.

Iowa Board of Examiners.

THE next meeting of the Iowa State Board of Examiners will be held at Iowa City, Iowa, commencing June 3, 1918, at 9 A.M.

For further information address

J. A. WEST, *Sec'y*,
417 Utica Bldg., Des Moines, Iowa.

Wisconsin Board of Examiners.

THE Wisconsin State Board of Dental Examiners will hold their spring examination, June 17, 1918, at the Marquette College, Ninth and Wells sts., Milwaukee, Wis. All applications must be in the secretary's hands thirty days before examination.

F. A. TATE, *Sec'y*,
Rice Lake, Wis.

South Carolina Board of Examiners.

THE annual meeting of the South Carolina Board of Dental Examiners will be held at The Jefferson, Columbia, S. C., beginning promptly at 9 o'clock, Monday morning, June 24, 1918.

All applications must be in the hands of the secretary by June 14th. Application blanks and full information may be obtained by addressing

R. L. SPENCER, *Sec'y*,
Bennettsville, S. C.

Pennnsylvania Board of Examiners.

THE next examination of the Pennsylvania Board of Dental Examiners will be held in Philadelphia and Pittsburgh on Wednesday, Thursday, Friday, and Saturday, June 12, 13, 14, and 15, 1918.

The examination in practical work will be in the Evans Dental Institute, 40th and Spruce sts., Philadelphia, and the University of Pittsburgh, Pittsburgh, on Wednesday, June 12th. The examination in operative work will be held at 8.30 A.M. and the prosthetic work at 1.30 P.M. Applicants are required to furnish all instruments and a patient for the operative work.

The theoretical examination will be held in Musical Fund Hall, Philadelphia, and College of Pharmacy, Pride and Bluff sts. Pittsburgh, beginning at 9 A.M. on Thursday, June 13th.

Application papers can be secured from the department of Public Instruction, Harrisburg.

ALEXANDER H. REYNOLDS, *Sec'y*,
4630 Chester ave., Philadelphia.

Indiana Board of Examiners.

THE next meeting of the Indiana State Board of Dental Examiners will be held at the State-house, Indianapolis, June 17th to 22d inclusive. Applications and other information may be obtained by addressing.

H. C. McKITTRICK, *Sec'y*,
Indianapolis, Ind.

Michigan Board of Examiners.

THE next meeting of the Michigan State Board of Dental Examiners will be held at the Dental College, University of Michigan, Ann Arbor, Michigan, June 17 to 22 inclusive. Applications and other information may be obtained by addressing

B. S. SUTHERLAND, *Sec'y*,
Owosso, Mich.

Rhode Island Board of Registration.

A MEETING of the Rhode Island Board of Registration in Dentistry for the examination of candidates will be held in the State-house, Providence, R. I., June 18, 19, and 20, 1918. Applications, accompanied with the proper fee, should be in the hands of the secretary by June 11th.

For further information address

ERNEST A. CHARBONNEL, *Sec'y*,
139 Mathewson st., Providence, R. I.

New Jersey Board of Registration.

THE State Board of Registration and Examination in Dentistry of New Jersey will hold their annual meeting and examination in the Assembly chamber, at the State-house, Trenton, N. J., on June 24, 25, 26, 27, and 28, 1918. License fee $25, re-examination $10.

Applications must be filed complete ten days before the date of the examinations. Address all communications for further particulars to

JOHN C. FORSYTH, *Sec'y*,
430 E. State st., Trenton, N. J.

North Carolina Board of Examiners.

THE next meeting of the North Carolina State Board of Dental Examiners will be held at Wrightsville Beach, Wilmington, N. C., beginning promptly at 9 o'clock on Monday morning, June 17, 1918. For further information and application blanks address

F. L. HUNT, *Sec'y*,
Asheville, N. C.

Maine Board of Examiners.

THE Maine Board of Dental Examiners will hold their regular examination, beginning July 1, 1918, at 8.30 A.M., at the State-house.

All applications and fees, $20, must be in the hands of the secretary by June 21, 1918.

The examination for DENTAL HYGIENISTS will be given at the same time; fee $10.

WILL S. PAYSON, *Sec'y*,
Castine, Maine.

South Dakota Board of Examiners.

THE next meeting of the South Dakota State Board of Dental Examiners will be held at Sioux Falls, S. D., beginning promptly at 9 o'clock, Monday morning, July 1, 1918.

All applications must be in the hands of the secretary by June 24th. Fee for examination $25. No reciprocity or interchange. Full information and application blanks may be received by addressing

L. S. SPENCER, *Sec'y*,
Watertown, S. D.

UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING MARCH 1918.

March 5.

No. 1,258,413, to PAUL V. HUMPHRIES. Interchangeable anterior tooth.

No. 120,731, to THOMAS FEALY. Trade-mark for preparation for the treatment of pyorrhea.

March 19.

No. 1,260,011, to WILLIAM MARK MUCHOW. Dental-floss container.

No. 1,260,118, to EMIL R. ZÜRCHER-HINNEN. Artificial tooth.

No. 1,260,139, to GEORGE L. BROWN. Fountain toothbrush.

DR. ARWED RETTER.

THE

DENTAL COSMOS

VOL. LX. JUNE 1918. No. 6

ORIGINAL COMMUNICATIONS

Replanting *vs.* Apicoectomy.

By C. EDMUND KELLS, D.D.S., New Orleans, La.

[Copyright 1918]

IT is undoubtedly safe to say that the operation of apicoectomy is quite "the thing" nowadays, and is, in fact, a fad with many up-to-date operators. It is to be seen at clinics, in the "movies," and, taken all in all, is always most interesting to see, staged as it usually is with the accompanying dramatic accessories of *so-called* asepsis.

But, "coming down from the clouds," as it were, will the operation, as usually performed and as *invariably seen* by the writer, stand analysis, and how will it compare with the apparently neglected operation of replanting for the accomplishment of the same purpose?

From the operations the writer has witnessed, and from what he has read, the methods of procedure in this operation may be divided into three classes:

(1) The root-canal or canals, as the case may be, are first thoroughly (?) filled, after which the root-ends are amputated and smoothed off.

(2) The root-ends are amputated before the canals are filled, and then the ends of the roots are drilled out, and the ends of the canals filled with aseptic amalgam to a limited depth only.

(3) The teeth are taken as they come, the root-ends are amputated, the canals are left as found—good, bad, or indifferent, as the case may be—and the case dismissed, probably never to be seen or heard of again.

Let us now consider these various methods inversely as they have been enumerated.

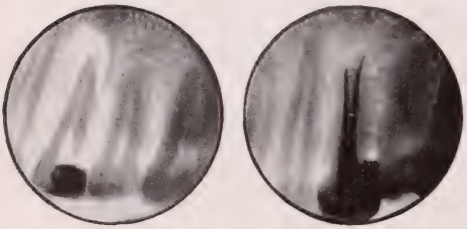
Class 3. This technique needs no criticism. It stands condemned upon its face, and yet the writer has seen just such methods practiced.

Class 2. Does it not appear impossible to amputate the septic end of a septic tooth, drill up or down, as the case may be, into a septic canal, and fill this *septic end* with *aseptic* amalgam (leaving the balance of the canal and pulp chamber to be filled subsequently), and leave the tooth in a satisfactory condition? The only way to convince doubters of the soundness of this method would be to in-

sert septic teeth in a plaster model to simulate natural conditions, operate upon these teeth in the manner described, and then make bacteriological tests of the teeth. But where is the operator who pursues this method who will subject his work to such a test?

Class 1. This method should undoubtedly appeal to the more conservative operator as being the most rational of all, and yet its weak spot lies in the difficulty

Fig. 1.



of *filling the root-canals satisfactorily to their very ends.* The writer contends that if the canals are thus filled, the trouble beyond the end of the root will usually be taken care of by nature, and consequently, no apicoectomy will be needed. As proof of this contention the skiagraphs, in Fig. 1, showing a case before and after treatment, are submitted.

More often than not the root-canals cannot be satisfactorily prepared and filled, and in these cases apicoectomy could not possibly produce satisfactory results. It has been the writer's privilege to see, in the course of regular practice, a few patients from other cities who have had roots "apicoectomized" by some of the best-known men in the country, and very rarely have the results been satisfactory. It may be a coincidence, of course, but the facts remain just the same.

REPLANTING.

It has been shown that apicoectomy is most likely to succeed where it is least indicated, if not wholly unnecessary, and that where most needed its failure is assured. On the other hand, replanting offers the best chance of saving just such teeth as apicoectomy cannot save, and which otherwise must be lost.

The writer's clinical experience with this operation dates back to November 1880, when his first case was undertaken, so that he has had some opportunity for the observation of the success of the operation. Success, however, is a relative term. What one operator might call a satisfactory result another might call a failure.

The writer considers that any natural tooth that is conserved for a period of five years, either by replanting or implanting, should be considered a satisfactory operation, and when his records show that few *replanted* teeth have failed before ten years of use, he believes that replanting is justifiable in any case that appears at all hopeful, and in some that might be classed as hopeless.

PROGNOSIS.

Moreover, when we consider that a lower molar which was replanted in June 1891 by the *crude methods then in vogue,* lasted nineteen years, and many others have lasted more than fifteen years, why

Fig. 2.

can we not hope that by the more careful technique now employed, our present operations should last even longer than that? The writer does not hesitate to prophesy that when some of our *able operators* tire of apicoectomy because of its non-success, and turn their attention to replanting, new methods will be devised which will revolutionize the operation to such an extent that instead of having the peridental membrane destroyed, and a

tooth held in place by a process of ankylosis, as has usually occurred in the past —and which very process leads to the ultimate loss of the tooth through its destructive forces—this membrane will be preserved, the tooth again held in its socket by normal gomphosis, and its permanence assured. That this result has already been accomplished in occasional instances is the sincere belief of the writer.

A skiagraph of the molar just referred to is shown in Fig. 2. It is a reproduction of an untouched film, and was taken many years after the tooth was replanted. The peridental membrane is distinctly shown.

LIMITATIONS OF THE OPERATION.

It must be conceded that replanting is naturally best adapted to tapering, single-rooted teeth, although replantation of lower molars, when their roots are neither divergent or curved, may be safely undertaken. The crushing of the crown or breaking of the root in such a manner as to render replanting impossible is a contingency which must always be reckoned with.

DESCRIPTION OF THE AUTHOR'S METHOD OF REPLANTATION.

Replanting, as *now* practiced by the writer, will next be described:

Making the splint. Usually, before the time reserved for the operation proper, an impression is taken of the tooth to be operated upon, together with one or more teeth upon each side, and a splint is struck up of No. 35 gage (B. & S.) pure gold. When the patient returns this is burnished to the teeth, and as well as possible into the interdental spaces. It is carefully removed to prevent springing, and a small amount of 22-k. solder flowed at each of the interdental depressions away from the incisal edge, both labially and lingually, which stiffens the splint materially. It is again burnished upon the teeth, and then laid away until ready for use.

Preparation:

(1) Every effort is made to have as clean an operation as possible. Laboring under no illusion, no attempt is made to *stage* "surgical asepsis."

(2) The heads of the patient, operator, and assistants are covered with clean—*not sterile*—caps. No gowns are worn.

(3) The towel placed on the patient is *clean,* but not sterile.

(4) The extracting forceps, lancets, curets, and an abundance of tweezers and mouth mirrors, and whatever other *instruments* may be needed, are sterilized

Fig. 3.

in a formaldehyd sterilizer, while towels, tape, and floss silk, small glass beakers, etc., are thoroughly sterilized according to *surgical custom,* in a Rochester combination sterilizer.

(5) An irrigating device (Fig. 3) with its rubber tubing and suitable tip is sterilized and charged with warm normal salt solution and kept warm.

The technique:

(1) The region is anesthetized by means of novocain-suprarenin.

(2) While realizing that it is impossible to sterilize the mouth, it is fully appreciated that to have it as clean as possible is advisable. So when all is ready, the first step is to thoroughly wash the mouth, teeth, and all the interdental

spaces with an antiseptic solution by means of a compressed-air irrigating machine (not spray), as shown in Fig. 4. Of late, Dakin's solution is being tried

Fig. 4.

An ordinary Hygiea nursing bottle, and stand for same. Rubber stopper held in place by removable clamps. Funnel and valve combined through which the bottle may be quickly filled without removing the stopper. Turning the funnel to the right opens the funnel, and the bottle may be filled; turning it to the left closes it. By turning it more or less, the pressure on the bottle may be regulated. A clip is provided for holding the "tip." The bottle holds eight ounces of solution. It is connected to a compressed-air line in which the pressure has been reduced to five pounds.

out for this purpose, instead of hydronaphthol, which was used in the past. Particular attention is given to, and a great deal of fluid used upon, the tooth to be replanted and its adjacent neighbors.

(3) The tooth to be operated upon is then carefully isolated by means of napkins.

(4) The gum region all about its neck is thoroughly dried by means of napkins, followed by *filtered* compressed air, then painted with equal parts of aconite and iodin, and again dried with filtered air.

(5) By means of a suitable and exceedingly sharp lancet, the gum is carefully dissected from the tooth, care being taken to injure the gum as little as possible. (Fig. 5.)

(6) The greatest care must be used in selecting the forceps, for if the beaks do not fit the root, it may be fractured. None but perfectly smooth-beaked instruments should be used.

USE OF THE FORCEPS.

The writer is particularly fortunate in having a number of forceps specially well adapted to this class of work. Besides the two pairs of the regularly cataloged Kells forceps, designed by his father, as shown on the left side in Fig. 6, he has a number of different sizes and angles, all with smooth beaks made to his own patterns, and from this lot at least one can undoubtedly be found to fit any normal tooth. These were sent out, *soft and in the rough,* from the factory; reshaped and reground by the writer as they were tried on innumerable extracted teeth at the laboratory bench, until they were satisfactory, whereupon they were returned to the factory for the final finishing and tempering.

This work took up many a leisure hour, but the writer was young at the time and rather enjoyed it, and he believes that whatever success he may have had in extracting difficult teeth and roots during all the years which have passed since then is largely due to the adaptability of these instruments to their purposes, for besides the instruments here shown he also has others similarly designed and made for the molars.

Fig. 5.

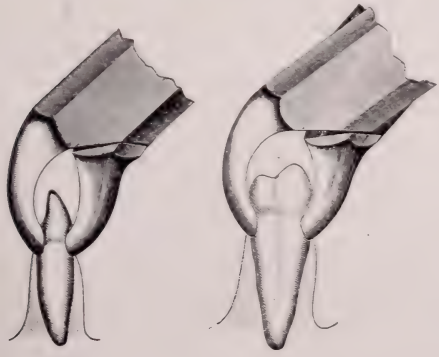
According to the writer's ideas, the

forceps and method of gripping the tooth as illustrated in a catalog and shown in Fig. 7, are both radically wrong. The forceps he uses are operated in an entirely different manner. The sharp edges of the beaks are gradually worked up under the gum without injury to it, along the root of the tooth, and pushed up or down, as the case may be, as far as possible. In Fig. 6 are shown typical teeth in the grasp of such forceps. With such well-fitting beaks the danger of crushing weak roots is reduced to a minimum, and all such teeth which have been extracted for the purpose of replanting have invariably been removed without injury.

Fig. 6.

The beaks of the forceps are here shown farther up on the roots of the teeth than they would naturally be placed in ordinary extractions, though sometimes, in fact quite often, the beaks act as double inclined planes, and the teeth are popped out with quite a snap, so that from the sound one would think the tooth were broken.

Fig. 7.



(7) The tooth is now very carefully extracted, and immediately placed upon a sterile napkin and covered with another.

(8) In the days of old, the socket was never curetted, and yet the abscess invariably healed, but today, immediately upon the extraction of the tooth, the socket is carefully curetted, washed out with warm saline solution with the irrigator (Fig. 3), and then carefully packed with small, sterile, gauze pads. By means of this gentle stream (five to eight pounds air pressure) such a socket can be very thoroughly cleansed without producing any irritation, which result

probably cannot be so satisfactorily accomplished in any other way. Swabbing it out with gauze must necessarily produce a certain amount of trauma. The napkins are now removed from the mouth and the patient dismissed for the time being.

(9) The tooth, being handled in the napkin and never touched by the fingers, is now carefully wrapped with the sterile tape as completely as possible (Fig. 8), and the tape tied on with the sterile floss. In this way the entire portion of the root which will be returned to the socket is protected from accidental contamination during the process of preparation.

Fig. 8.

(10) The tooth is handled in a sterile napkin or by sterile tweezers throughout the operation. Whatever is necessary to place the root-canal in proper condition is now done. If necessary, one or more skiagraphs are taken during the operation. In the end, the root-canal has been cleansed, sterilized, and filled with zinc oxychlorid, possibly gutta-percha points or iridio-platinum wires being used to carry it to place. The end of the root is now cut off *if necessary,* which is not always the case.

If the apical foramen is *small enough,* it is drilled out and threaded for an S. S. W. retaining screw with the instruments furnished for the purpose, and one of these gold or platinum screws is set in, it being first covered with a thin mix of zinc oxyphosphate. If too large for such a screw, the canal is reamed out and filled with gutta-percha. The end of the root and the filling are made perfectly smooth.

The pulp chamber is then filled with oxychlorid of zinc and finished off with whatever material is indicated, when the tooth is ready for replanting. During this part of the work the tooth is securely held by an assistant, giving the operator the use of both hands, thus expediting the work very materially. Then the patient is returned to the chair, and *if necessary* the region is again anesthetized as before.

(11) The tape is now removed from the tooth, and the tooth is placed in normal salt solution of about body temperature.

(12) The mouth is again well flushed out with the antiseptic lotion. The socket is isolated by napkins, the *surrounding tissue only* is napkin-dried, filtered-air-dried, painted with aconite and iodin, and filtered-air-dried again. *Iodin should never be used in the socket.*

Upon removing the gauze packing, it is necessary to wash out the blood-clot and cleanse the socket thoroughly, which is again accomplished with warm saline solution in the irrigator, and a *little* fresh bleeding, which is desirable, is started.

(13) The tooth is now grasped by sterile tweezers, laid on a sterile napkin, and being handled in the napkin is gently forced to place, and held there securely for about two minutes.

(14) The little blood that usually oozes out at the margins of the gum is wiped away, the splint is set with oxyphosphate in the usual manner, and the operation is complete.

POST-OPERATIVE TREATMENT.

Little or no after-pain results from this operation, and in a few days the sinus, if there was one, is found closed, and the parts are apparently back to normal. During the first week the patient is seen nearly every day if convenient, and the interdental spaces and the necks of the teeth are thoroughly cleansed with the irrigator, and the patient urged to rinse the mouth frequently with the usual mouthwash, or even plain water.

It is usually found that the thickness of the splint, or rather let us say its *thinness,* does not materially interfere with the occlusion, but in some instances a glove-fitting rubber splint has been made to take in the occlusal surfaces of all the teeth in the opposite jaw, and so made as to relieve the replanted tooth of any pos-

sible strain. This to be worn at meals, and possibly at night when "gritting of the teeth" might occur.

The splint is worn for from four to six weeks, at the end of which time the tooth should be quite firm. The margins of the splint are kept well away from the gums, thus leaving the interdental spaces open at the gum line. In one very hopeless case the splint was worn even longer without the tooth becoming sufficiently firm, so the splint was removed, the replanted tooth and a neighboring one were banded, the bands soldered together, and cemented on. This appliance was neither uncomfortable, unsanitary, nor unsightly, and was worn for several months, when the refractory tooth finally did become firm, and so it remains today, nine years after.

THE TIME FACTOR IN CHOOSING THE OPERATIVE PROCEDURE.

It must not be forgotten that ofttimes when there may be no choice between the two operations, the one being just as practical as the other, the question of time involved may be of paramount concern.

The apicoectomist, on the one hand, must spend some time, possibly a great deal, in preparing the root-canals and filling them prior to the operation—if that is his method; or if he amputates the root-end and fills with amalgam first, then considerable time may be spent upon the root-canals afterward. Again, the operator who packs and treats the wound after the operation for a week or more, consumes that many more days. So, taking it all in all, none of these operators can take a case in hand and dispose of it expeditiously.

On the other hand, whatever its previous history, the operation of replanting can be *begun and completed in one day.* Naturally, it is safer to see the patient the following day, but it may not be necessary.

This question of time may be one of great moment to out-of-town patients, and the writer would not hesitate (based entirely upon past experience) to allow a patient to leave the city immediately after the operation, consigning him to the care of his local dentist for the watching of the case and re-cementing on of the splint, should it loosen, which it will do sooner or later. When possible, however, he prefers to have the patient remain for several days, merely as a precautionary measure.

MODIFYING THE OPERATION OF REPLANTATION TO CORRECT ALIGNMENT OF TEETH.

Usually, when a tooth requires replanting, it is replaced in its normal socket in the same position it originally held. But very occasionally a case will present when the tooth which needs replanting happens not to be standing in line with its neighbors, and, while one is operating, the socket may as well be changed and the tooth be replanted in the position in which it rightfully belongs, and thus improve upon the original conditions. Under these conditions, several details of the simple replanting operation must be modified to meet the changed conditions. These modifications are as follows:

MAKING THE SPLINT.

Two impressions of the mouth are now taken instead of one, the one to be retained to show the conditions as presenting, the other to be used for making the splint. The tooth to be replanted is carefully cut out of this model, and set in its new position with very thin plaster. From this the usual fusible metal die and modeling compound counter are made; then the counter die is *slightly deepened and enlarged all about the tooth to be replanted.*

The splint is struck up of No. 35 gage (B. & S.) pure gold, and burnished into the enlarged impression in the counter where the metal die would fail to carry it. This should fit all of the teeth snugly except the crown of the replanted tooth. The splint is placed in a small jar of alcohol, and all of the succeeding stages are carried out as already described until we reach No. 7.

CHANGING THE SOCKET.

After the socket has been curetted, it is very carefully cut away in such a manner as to allow the tooth to be replanted in the position desired. This cutting is done with an Ottolengui implantation reamer, whch is admirably adapted to this purpose.

After the socket is trimmed, the tooth, being handled in a napkin and never touched with the fingers, is tried in, and if it does not go to place, the socket is again trimmed a little, and this is repeated until the socket is as desired. It is advisable to proceed with this detail very slowly, as unnecessary cutting away of the alveolus is to be avoided.

Again the operation proceeds as before until the time for setting the splint.

SETTING THE SPLINT.

The mouth having been prepared as per step No. 2, the tooth is finally set in place, the splint put in place and carefully burnished to all the teeth and well into the interdental grooves, *except about the replanted tooth.* It is then removed and rinsed and a small quantity of 22-k. solder flowed into all the interdental depressions *near the gum line, keeping it away from the cutting edges,* and again dropped in alcohol. The splint is once again put in place and reburnished, again removed, returned to the alcohol jar, and dried.

A very small quantity of temporary stopping is then spread over the depression which takes in the replanted tooth (this depression was slightly enlarged, it must be remembered), the tip of the tooth is moistened to prevent the adhesion of the temporary stopping, the splint is warmed slightly, and forced to place. The temporary stopping molds itself about the replanted tooth, produces just enough pressure to force it up a little in the socket, and thus overcomes the natural *spring* that such a socket possesses.

The tooth can be held in the exact position desired with a suitable sterile instrument adjusted to its neck (which is not covered by the splint), while the splint with its softened matrix is adjusted. Allowing a moment or two for this matrix to harden, the splint is removed, dried, and then set *permanently* with cement. The drying of the splint is done by placing it in a sterile gauze napkin, and then the alcohol can be quickly dried out by a few blasts of the filtered compressed air.

Past experience has proved that it is not necessary to replant the tooth the same day that it is extracted, but as a rule this is practicable, and undoubtedly it is better to replace it as soon as possible. One case was met with in which a central incisor was knocked out by a fall and not replaced until four days later, and yet at last accounts, *five years later,* the tooth appeared perfectly normal.

CONCLUSIONS.

Considering carefully the relative advantages and disadvantages of replanting and apicoectomy, the writer concludes that—

(1) The conditions to be found within the root-canals and beyond the root-end must necessarily be and are infinitely better after replanting than after apicoectomy.

(2) That whenever a tooth or root can be extracted without injury to itself, there can be but one choice between the two operations.

ILLUSTRATIVE CASES.

Case I. Upper lateral root carrying a Richmond crown with the conditions clearly shown by the skiagraph, Fig. 9. This undoubtedly would appear to be a typical case for apicoectomy by the faddist, only to have resulted in failure, as the sequence will show.

Upon the showing of this picture, replanting was decided upon, although it was considered a hopeless case, and only undertaken upon the earnest solicitation of the patient.

Upon the extraction of the root (root and crown without injury to either) much of the gutta-percha around the pin was found perfectly loose, and the canal

was in very bad shape, as may well be imagined.

To have done anything at all to such a canal by means of an apicoectomy operation would have been simply impossible, but with the root in the hand it could be and was thoroughly cleaned and filled. The socket was thoroughly curetted, the

Fig. 9.

tooth replanted, and splinted as usual. Recovery was normal, and at the end of six weeks the tooth was perfectly firm, and all conditions appeared perfectly satisfactory, as shown in Fig. 10.

From this picture one would infer that there was but *little left of the root* but the filling, and while this is true to a

Fig. 10.

certain extent, the real conditions are not quite so bad as they appear.

Case II. A lower lateral had been under treatment (the usual kind) for over a month, by the end of which time the patient's patience faded away. Upon examination of the tooth it was discovered that the root had been perforated, and so replanting was decided upon, and the operation was performed according to routine.

With the tooth in the hand, the perforation through the side of the root could be taken care of, which would have been impossible under any other circumstances, so here again is a case where replanting was the only rational procedure possible.

Case III: An upper second bicuspid with a fistula could not be "managed," and it came into the writer's hands for replanting. With the tooth in hand two canals appeared in evidence, and one was still unmanageable, so a bristle was run through the other, the tooth laid upon its side, and skiagraphed as shown in Fig. 11. With this picture as a guide, both canals were expeditiously prepared

Fig. 11.

and filled, the tooth replanted, and in a few days the fistula was closed, and in due time the tooth resumed its natural duties.

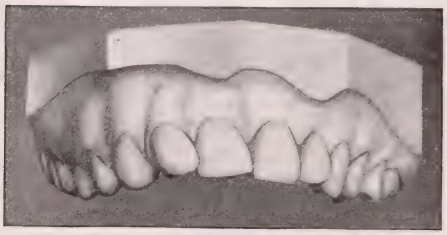
Owing to its *enlarged* and curved end, this tooth was one of the most difficult to extract that had been met with in many a day; the full force of the writer's strength was necessary to get it out. As a result of this, the margin of the labial alveolar plate was slightly fractured, and a few weeks later a small piece exfoliated, but produced no serious consequence, as the tooth is perfectly solid at this writing. Here again is still another instance where apicoectomy would have resulted in complete failure.

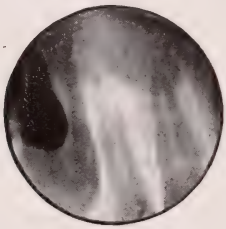
Case IV. Fig. 12 happens to be a case operated upon very recently, the patient being a miss of fifteen. The pulp of the upper right lateral was devitalized by

"regulating" when she was nine years of age. The tooth had been abscessed ever since, and presented with a large fistula over the labial surface, and an examination showed considerable destruction of the labial alveolar plate.

The outlook was not encouraging, but an operation was thought worth while. The socket was cut out so as to allow the tooth to be replaced in the arch. Upon completion of the operation the little girl went to a picture show, slept

Fig. 12.



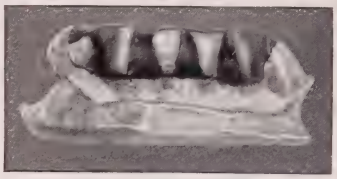


that night as though nothing had happened, and the next day had only the splint to show for it all when she smiled.

Many other cases could be produced to demonstrate that replanting can restore to usefulness many teeth that must otherwise be lost, but these should suffice. It must be understood that there are no claims made as to the methods herein described being the only ones possible for this operation. Other operators may have different ways of accomplishing equally as good results. The aim has been only to describe as briefly as possible the various details *as actually carried out* in the writer's practice.

This paper is written solely for the purpose of drawing the attention of conservative men of our profession to the advantages of an operation which possibly many of them have overlooked, and if it should perchance serve this purpose the writer will feel well repaid for the time spent upon its preparation.

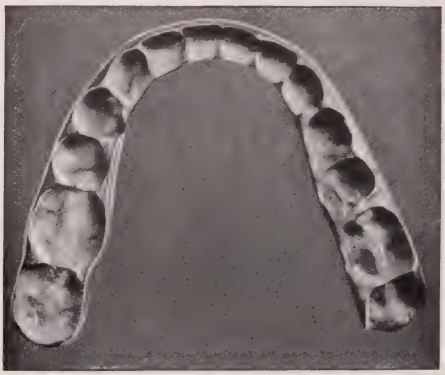
Fig. 13.



Typical die, and splint made thereon.

An attempt has been made to give a clear and concise description of every step in the operation, so that one who has never replanted a tooth can, if he will, by following these instructions carefully, do so without fear of ill results.

Fig. 14.



Typical glove-fitting splint.

The operation is not difficult. It only requires care and an *absolute* appreciation of the necessity of attention to details. While other methods are possible, this one has proved, by the acid test of time, to be satisfactory.

1237 Maison Blanche.

Dental Engineering and the Normal Arch.

By PERCY NORMAN WILLIAMS, D.D.S., New York, N. Y.

(Read before the Orthodontia staff, Forsyth Dental Infirmary for Children, Boston, February 11, 1918.)

DENTAL engineering is a term which has been applied so often in describing orthodontic treatment during the past three years that the expression has found a permanent place in dental literature. If we are to accept dental engineering and allow it to become a part of our science, it is well that we clearly understand what it means, and its relation to nature's methods of arch construction. In the first place, all branches of engineering are based upon exact mathematical formulæ, and variations are always considered. Nothing is allowed for variation until the amount of variation has been carefully computed. The finished product must comply absolutely with the predetermined result.

Engineers always assume that if no error has been made in the mathematical calculation, the desired work can be accomplished, and right here we meet the first obstacle in applying engineering methods to orthodontia. In the first place, nature does not grow flowers, animals, human beings, or dental arches to mathematical exactness—the almost infinite number of variations is one of the charming things in nature; but, while not arbitrary, she does follow certain well-defined laws, some of which will be mentioned later.

Another and more serious difficulty in applying engineering methods to orthodontic treatment is that, once we adopt them, we become slaves to a system which is so exacting that it becomes impossible of realization. Dental engineers work under the assumption that teeth can be moved to within one one-thousandth of an inch of some predetermined points, and rest their assumption upon the ability of the operator to move and place cusps, sulci, and planes in the exact position as shown on the previously laid-out chart. It is unnecessary for me to elaborate upon this fallacy. The old proverb that "Fools rush in where angels fear to tread" can be appropriately applied to the man who knows all about engineering, but little about orthodontic treatment. Such a man gets an idea and allows it to dominate him, distorting his judgment and pushing aside every other consideration to accomplish the purpose.

Most of us who have moved teeth for any length of time know that when we place teeth in positions which approximate occlusion, nature comes to our aid, and by means of dynamics and the inclined planes proceeds to occlude the teeth, and she can do with her methods what man has failed to do since time immemorial. It is fortunate for most of us that this is true, and it is my contention that even if man possessed the ability to place cusps to within $\frac{1}{1000}$ of an inch of the position as indicated on a chart, this is wholly unnecessary.

DESIRABILITY OF A METHOD FOR DETERMINING THE SHAPE OF THE ARCH.

It is of course true that occlusion is largely a mechanical problem, and as such it is closely related to mechanical engineering, but we must always have in mind that a working formula to be of any value must be capable of execution. That there has been and still is a need for some method of predetermining the shape of the arch none of us will dispute.

Ever since orthodontia became a speciality the need for this has been con-

stantly seen, but little has been done to that end. For years the Hawley charts remained the only guide for arch form, and we must concede that they were better than nothing. We have for a long time paid altogether too much attention to designing appliances and perfecting technique without due regard for a great and fundamental problem, that of determining arch form. The ease with which the profession becomes obsessed with a desire to perfect technique was seen some years ago when members of the profession reached such a high degree of skill in manipulating non-cohesive gold foil—some men even going so far as to fill root-canals with this material. It has since been seen that this took precedence over some equally if not more important problems. We emphasize again the need for a flexible working hypothesis for predetermining arch forms, and such a system must be based upon an investigation into the shapes of normal arches as found in nature. Arbitrary laws and mathematical calculations are valuable only in so far as they assist us in determining nature's intentions and faithfully reproducing her works.

Angle, as well as other well-known men in the orthodontic field, has, it seems to me, paid altogether too much attention to the development of appliances, with corresponding neglect of important principles. This is well illustrated in the development of the pin and tube appliance and ribbon arches. Nobody denies that the pin and tube was an attractive, neat appliance, but it is incorrect in principle in a large majority of cases. Any appliance which is attached to the front teeth to makes these teeth afford reciprocal anchorage for moving molars distally is not only worthless but actually does harm to the point of creating deformities. It cannot be denied, and we might as well face it as a fact, that there are many examples of the work of prominent orthodontists, as well as of that of general practitioners, which from an artistic as well as an anatomical standpoint are a disgrace to the science, and this in spite of the fact that they may be fair examples of occlusion, but far from normal, because the normal in anatomy is the very basis of art, and therefore could never cause disfigurement.

I do not wish to be misunderstood here. I of course firmly believe that normal occlusion is the very basis of dentistry, but we have no moral right to point with pride to the fact that we have brought teeth into some kind of an occlusion based upon our own personal opinion, and assume that the anatomical form of the arch is correct. The common practice of first selecting the appliance or the system, and then being limited and becoming slaves to the narrow sphere of this particular appliance, is not only illogical but absurd. It would be better to have a clean-cut, definite idea of what is to be done in a given case, and then select the appliance best suited to accomplish the desired movement.

This principle of using the anterior teeth as anchorage for moving molars and creating space for cuspids as a common practice was strongly impressed upon me recently, when a woman called to consult me regarding orthodontic treatment for her daughter of twelve years. About the first question she asked was, "Is this work going to change the child's mouth?" I assured her that a normal arrangement of the teeth would improve the girl's appearance, but she seemed very much concerned lest the child's mouth should be made larger. She then informed me that she had known several children whose teeth had been straightened and the results, to use her own words, "were hideous," and if it were going to change her child's mouth to the degree that she had seen in others, she guessed she would not have the work done. I tried to assure her that the very basis of art was normal anatomy, and that what she had seen was not the normal. This is a serious matter, and one which cannot be lightly brushed aside. Is it not about time to get down to a scientific basis for the arrangement of teeth and eliminate this stigma from the profession? This moving of the anterior teeth forward to create room for cuspids is not confined to any one school or to the followers of any particular system, nor is it due to any particular kind of

appliance, but to a lack of any definite plan of action and of a comprehensive idea of the positions the teeth should occupy in a normal arch. Whether it be a fact or not that teeth can be occluded in one arrangement only, certain it is that there are arches that are characteristic of the operators who shape them. There is a certain orthodontist whose patients' arches I could recognize if I excavated them from the earth twenty years from now. The teeth are so carefully arranged after his own distorted mental image of what the normal arch really is, that there would be no mistaking them.

IMPORTANCE OF DIAGNOSIS OF CAUSES BEFORE ATTEMPTING TREATMENT OF MALOCCLUSION.

I wish this to be taken in the spirit in which it is intended, *i.e.* that of constructive criticism. If I speak frankly it is because I feel that these facts have long been known but rarely discussed, and the time has arrived when we should deal with this question with a critical, analyical mind. Most of us who have been practicing orthodontia for any length of time know that there are many cases where the results have been disappointing. Therefore we should meet on common ground when it comes to the question of inquiring into the causes of these unfavorable results, and look for a remedy. The first step toward this is careful, painstaking diagnosis, and such a diagnosis does not end when we consider the relation of the lower teeth to the upper; be this done never so thoroughly, there still remains the relation of the teeth to each other within each jaw. In quite a percentage of cases we find that the upper first molars are not equidistant from the median line. This means that one molar has migrated toward the median line, probably due to the premature loss of some tooth on the affected side.

It must be borne in mind that a first permanent molar drifts forward with remarkable ease when unobstructed, and unless some method or system is devised for determining the correct position of this malposed tooth, the arch can never be symmetrical nor the teeth occupy normal positions. Frequently there is premature loss of a deciduous cuspid and a subsequent drifting forward of the teeth on this side, so that when the permanent cuspid erupts there is a collapsed condition in the region, with no room for the cuspid. A careful examination here, to determine what teeth have drifted to cause this crowded condition, would enable the operator to intelligently correct the trouble and place the teeth where they belong, that is, in their norman positions. Unless he first determines what teeth are out of position, it is highly probable that he will move the wrong teeth in trying to create room for a malposed cuspid. This is one of the chief causes of the unhappy results we see in children who have undergone orthodontic treatment.

We have reached a point where it becomes necessary to break down certain traditional beliefs which have been obstacles in the path of orthodontic progress for a long time. In Angle's latest edition, under treatment of class I cases he says, "The malposed teeth are usually confined, however, to those anterior to the molars, and more commonly to the incisors." In further describing treatment of this class he says, "Not until the incisors had been moved labially sufficiently for the full admission of the cuspids into the line of occlusion was any effort made toward elevating them." Again he says, in describing class I cases, ". . . . the distinguishing characteristics of the class being the relative normal relations of the jaws and molars in correct relation mesio-distally, although one or more may be in buccal or lingual occlusion. The arches are diminished in size, and the teeth, especially the incisors, occupy positions lingual to normal."

I have carefully re-read several times the chapters from which I have here quoted, and I believe it to be the intent of the author that where there is occlusion of the first permanent molars, neither the upper nor the lower first permanent molar is to be moved distally.

If this be so, we have here one of the most fundamental errors which has ever been promulgated in dentistry. I shall be able to prove to your satisfaction, I hope, that in a large number of cases under class I it is necessary, in order to obtain symmetry and a normally shaped arch, to move distally the upper first permanent molar on at least one side, and often on both sides. This is especially true in cases where there is a collapsed area in the cuspid region.

Angle says, in describing a case of class I, ". . . . the result of the premature loss of the right upper deciduous canine which has disturbed the normal process of development of the denture. The upper incisors on the right side have been forced by the lip to occupy positions lingual to the line of occlusion, thereby compelling the right permanent canine, upon its eruption, to occupy a position of much labial prominence, but as the jaws and the molars are normal as to their mesio-distal relations, the case is easily diagnosed as belonging to this great class." Angle probably bases his assumption that the incisors must be moved forward to make room for a prominent cuspid upon a law which he has formulated, and because at the time he wrote the latest edition of his book the Baker anchorage had rarely been used except to move teeth in class II.

ANGLE'S LAW FOR OBTAINING HARMONY OF FEATURES THROUGH TOOTH MOVEMENT.

Angle's law for obtaining harmony of features through tooth movement reads as follows:

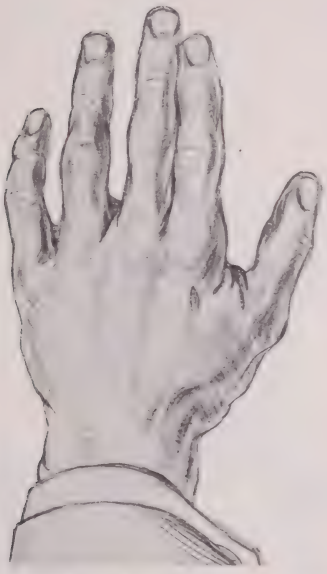
Now, the ability to determine the proper balance of the features is rare. One of our foremost teachers of art, Mr. E. H. Wuerpel, says that only one in two or three hundred of even art students ever succeed in mastering it, and these only after much observation and practice in sketching and modeling the human face. Yet, discouraging as even this seems, we believe there is a law for determining the best balance of the features, or at least the best balance of the mouth with the rest of the features, which artists probably know nothing of, and one which for our work is far more unvarying and more reliable than even the judgment of the favored few. It is, furthermore, a law so plain and so simple that all can understand and apply it. It is that the best balance, the best harmony, the best proportions of the mouth in its relations to the other features, require that there shall be the full complement of teeth, and that each tooth shall be made to occupy its normal position—normal occlusion. This law may be regarded as one of the cornerstones of the new school of orthodontia in contradistinction to the teaching that has always dominated the practice of the old school, that of leaving to the individual judgment of the operator, without any standard or law, the determination of the requirements in orthodontic operations in each given case.

Angle has stated a law here which is fundamental and unshakable, but its application is not a part of it, as he would have us believe. In fact, its practical application is just the question that we now consider paramount, namely, placing all the teeth in their anatomical positions. Angle considers the application of this law a simple matter, because he bases it upon the false assumption that if the first molars are in occlusion they are normal mesio-distally. Turning to other authorities, we find Case flatly contradicting this law of Angle's, and stating that in order to obtain harmony of features and beauty of form and expression the full complement of teeth is not necessary, and therefore in certain cases he advises extraction. It is very clear to one who reads the works of these men carefully that each of them is trying to state a law which will be universal in its application and obviate the necessity of individual judgment. We find a conflict of opinion here, and have no hesitation in stating that neither has offered a solution. These men, along with other authorities, have, it seems to me, tried to inculcate laws or principles that could be universally applied for producing artistic results, but which laws are without a scientific basis.

A study of normal anatomy is the very foundation of art as related to human form, yet there is no evidence that any of these writers have made even a superficial investigation to determine shapes of normal arches, their variation, and

the relation of arch form to facial contour. The profession has been misled

Fig. 1.



Normal hand from life, showing harmony between fingers and body of hand.

Fig. 2.

Showing same sized fingers as in Fig. 1. drawn on the body of a hand much too small. Note the ugly appearance.

Fig. 3.

A beautiful hand, with harmony between fingers and body of hand.

Fig. 4.

Same body of hand as in Fig. 3, with fingers much too small.

(Drawings by J. Earl Schrack.)

for years by the fundamental error that if teeth are moved into occlusion, artistic results follow. *This is true only where the teeth occupy normal positions in relation to the rest of the skull,* and we cannot move the upper teeth anywhere we see fit in order to obtain occlusion,

and expect artistic results to follow. The relation of the teeth to the skull is just as important as is their relation to each other. It is of deep concern to the parent of a child if in obtaining occlusion we produce deformity.

Let me quote here from Lischer:

> The duties of the orthodontist force upon him great responsibilities, and there is nothing in which the student of orthodontia should be more keenly interested nor better informed than in the study of the artistic proportions and relations of the features of the human face; for each of his efforts, whether he realizes it or not, makes for beauty or ugliness, for harmony or inharmony, for perfection or deformity. Furthermore, besides forming an important phase of the difficult art of diagnosis, it involves us in "the most remarkable problem of esthetics," viz. that of beauty of form. Ignorance of these requirements has led numerous operators into the unenviable position of having permanently marred the beauty of an otherwise handsome face.

ARCH FORM DETERMINED BY THE SHAPE AND SIZE OF THE TEETH.

The artist, in painting a portrait, reproduces on canvas the individual as he sees him; that is, he attempts to portray a personal likeness which will reflect character. The orthodontist is not rendering treatment primarily to obtain artistic results, nor is he arranging teeth to produce correct facial outline. These are incidental and but a secondary consideration to the all-important subject, correct anatomical arch form and normal arrangement of the teeth. It logically follows, then, that it is impossible for the operator to render orthodontic treatment and hope to obtain satisfactory results, when such a course of treatment is based upon his own individual judgment. Any opinion which rests upon his conception of what is artistic is absolutely precluded, also he is decidedly limited in the arrangement of the teeth. He is not free to shape the arch according to principles in art or to his own personal taste, because the shape and size of the teeth have already determined this, which completely eliminates individual judgment.

The relation of the teeth to the jaw is much the same as that of the fingers to the hand. I have discussed the question with several recognized authorities on portrait painting. It is the opinion among all of these men that the shapes and sizes of the fingers determine the shape and size of the hand; that is, with

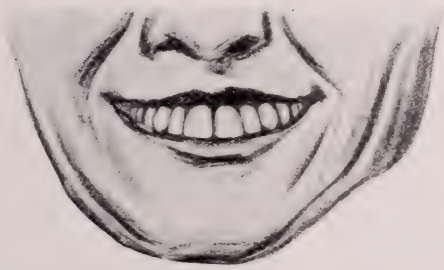
Fig. 5.

long tapering fingers we would have a long slender hand, and with broad, short fingers we would have a broad, short hand. Applying this principle to the teeth, we would expect with short broad teeth to have a broad jaw, and if the teeth harmonize with other physical characteristics, the individual would have a full round face. On the other hand, long narrow teeth would make a narrow jaw,

which would be found in a person with a long narrow face. I have had an artist draw some sketches of hands from life, and from these make some drawings of abnormal hands which illustrate my point. (See Figs. 1 to 4.)

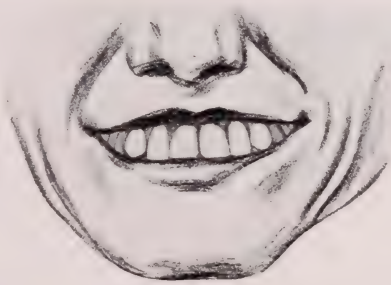
The amount of variation within a given type is extremely small. The variation is almost wholly dependent upon variations in the size of the teeth. The mesio-distal diameters determine the width of the arch, that is, there is a constant ratio between the diameter of the teeth mesio-distally and the distance between the first permanent molars. This enables us to determine what the width between the molars shall be. Once we get this we are able to find the radius for the front teeth, and with the aid of a small measuring instrument we can lay out the line for the bicuspids.

Fig. 6.



Drawing from life, with the anterior teeth arranged to a circle approximately normal for this sized arch. The laterals and cuspids appear narrow, due to foreshortening.

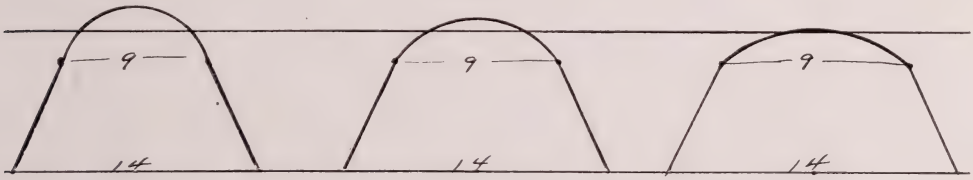
Fig. 7.



Same teeth as in Fig. 6, with abnormally large circle for the anterior teeth. Here the cuspids appear larger, because of the lack of foreshortening.

In an article entitled "Determining the Shape of the Normal Arch," published in the Dental Cosmos for July 1917, I submitted measurements and other data to substantiate my claims for the shape of the normal arch for the American type. I wish it clearly understood that I am not discussing any other type, and the variations I shall show are confined strictly to this class of individuals. When I say the American type, I refer to those descendants of the Pilgrim Fathers who are characterized by high cheek bones, firm jaws, and rather angular features. I have selected an individual who well represents this type (Fig. 5.)

Fig. 8.



Extremes in variation from given sized teeth. Ratio 14 : 9 maintained throughout.

I believe it to be a fundamental law, not only in man but throughout the animal kingdom, that the shape and size of the teeth determine the shape and size of the jaw. I am supported in this contention by Dr. Clark Wissler, director of the department of anthropology of the Museum of Natural History of New

York, who expresses the following opinion: "There is no anatomical part in mammals so uniform as dentition. Even between primitives and man there is a striking likeness in the shape of the jaw. Teeth make the arch, and the species variability is so small in a racial type that it requires careful measuring to detect the difference in shape."

It is stated upon reliable authority that Agassiz could take a single bone of an extinct species and reconstruct the entire animal, but he based his ability to do this upon an intimate knowledge of comparative anatomy, and it was always an average type, not one showing marked variation from the normal. The hypothesis which I submit to you is essential before normal variations can be determined, but the important lines of the arch must always remain the same in any variation. That is the 14:9 ratio. The three normal variations are shown in Fig. 8. It is impossible to have a correctly shaped arch without first constructing the average for a given size set of teeth; from this variations can then be made.

CONCLUSIONS.

(1) Dental engineering is an unfortunate term to use in describing methods of determining arch form. It imposes upon the profession strict mathematical formulæ impossible to follow, and contrary to nature's laws.

(2) Occlusion is a mechanical problem, and dynamics control the positions of the teeth. As we approach correct arch form and normal occlusion, nature, by means of the inclined planes, finishes the operation.

(3) Progress in orthodontia has been retarded by emphasizing methods and appliances and neglecting important principles and laws.

(4) Artistic results follow correct anatomical form. This eliminates individual judgment. Many arches are deformed and mutilated because judgment in art has been left to the individual.

(5) Because of incomplete diagnosis, many operators move the wrong teeth to obtain correct arch form.

(6) Normal occlusion produces artistic results only when the teeth are in normal relation to the skull.

(7) Teeth make the arch, as fingers make the hand, and arch variation is very slight except when teeth vary in size and shape.

40 East 41st st.

Asepsis *vs.* Antisepsis in Root-canal Procedure.

By DAVID WIELD McLEAN, D.D.S., Mount Vernon, N. Y.

(Read before the union meeting of the Fifth District and Jefferson County Dental Societies, held at Watertown, N. Y., December 14 and 15, 1917.)

ANY comprehensive consideration of root-canal procedure today should include three aspects, the economic, the mechanical, and the surgical. It has long been considered bad taste to discuss economics in a scientific paper, but I am firmly convinced that one of the reasons for the worldwide prevalence of wretched root-canal work is the deep-seated conviction many of us have that the patient is not willing to pay for anything else.

Let us suppose, for the sake of argument, that some man came to this meeting leaving a practice in which it was his custom to half devitalize the pulp and to half fill the root-canals with mummifying paste. Let us suppose this man goes home determined that he will fill every root-canal to the end. He will go back to a practice 60 per cent. larger than the one he left. I mean by that, if he takes care of the same number of patients and does his root-canal work as perfectly as is humanly possible, he will have to spend 60 per cent. more time in his office.

Where he could under the old *régime* devitalize a pulp and fill a canal in three-quarters of an hour, it may now take him three, four, or five hours, and sometimes more. The question arises immediately, Is the patient willing to pay for this, or must the dentist give the case this additional time without remuneration? If we say that he should do the work as suggested without additional remuneration, he will very likely go home and continue to do very much the same kind of thing he has been doing. His conscience may trouble him some, and he may lose some of his self-respect, but the important economic fact remains that he must earn a living; his family must have food to eat and clothes to wear, and his children must be educated.

Those employed in a philanthropic organization may fill root-canals to the end without remuneration because such an institution is endowed, but unfortunately the average dentist is not endowed, and however much we dislike a discussion of business matters in our professional relations, the fact remains that we shall never be able to put our ideals into practice until we consider well the business aspect.

The remuneration for root-canal work should be on the same basis for time required as is the remuneration for amalgam or gold work. And it is a great mistake to think for a moment that the patient is not willing to have it so.

The patient who questions a fee of ten, fifteen, twenty dollars or more for a root-canal operation will be willing to pay fifty dollars for an automobile tire, for the simple reason that he knows the service the tire is going to give him, and thinks it worth the price. The conclusion is very obvious. We must educate our patients to the importance of correct root-canal procedure. Explain to them the things we now know about focal infections and their systemic sequelæ. Do not frighten them, but let them know in a casual way that myositis, arthritis, endocarditis, kidney lesions, gall-stones, neurasthenia, neuritis, eye disturbances, skin disturbances, boils, etc., may follow in time from faulty root-canal procedure. Explain to them the possible dangers

from the so-called blind abscess, and also explain what immunity means. Point out that in a great majority of cases the patient's immunity wards off these ills, but if for some reason his resistance to infections is lowered, these things may follow.

Impress upon them the fact that for these reasons a great responsibility rests upon the dentist when he is engaged in root-canal work; that it is no longer possible for a conscientious dentist to partially devitalize pulps and half fill root-canals; that this work now requires a great deal more time than it once did, but that it is well worth it, and may be considered as health insurance. You will notice that I have not mentioned fees—it is not necessary. The patient already has some idea of your fees in general, and has probably figured that out for himself, and arrived at a fairly accurate idea of what they average per hour. Just let the patient understand that his welfare demands several hours of your time instead of one, and he will not only want it, but will insist on having it.

Just as soon as we can drive home to the rank and file of our profession the fact that painstaking and reasonably perfect root-canal work can be done, and that the patient can be educated to a proper appreciation of it; just so soon as we can drive home the fact that the X-ray machine will far more than pay for itself by facilitating our operations, just that soon shall we see the rank and file of our profession doing really good canal work, and checking up every filling with a radiograph. The day is coming—and we may look forward to it as the dental millennium—when there will be an X-ray machine in every dental office in which there is a dental engine, and the improved root-canal work resulting from its use will be the greatest boon conferred on humanity in several generations.

PULP DEVITALIZATION.

Inevitably linked with the question of root-canal procedure is the consideration of pulp devitalization. During the past two or three years many of us have quaked at the thought of devitalizing a pulp, and I fancy that thousands of pulps have been capped which should not have been left vital. Rosenow and Price have established beyond question the fact that infection may be found in a vital and even an unexposed pulp, and it is perfectly logical that this should be true.

We know that infection is migratory; that if we have a nidus of infection at any point of the body the bacteria developed in that nidus will be carried by the circulation and lymphatics to every part of the body, and that wherever they find a tissue whose resistance has been impaired they will stop there, and make that their point of incubation. When a pulp once becomes inflamed or exposed and has to be capped, there is not only the chance of the introduction of infection from the mouth or instruments, but there are circulatory changes in that pulp which result in a lowering of its resistance, and it may readily become a focus of infection, secondary to one somewhere else in the system.

Dr. Leuman M. Waugh of New York City has for several years claimed that it is better to devitalize a healthy pulp than to wait until it has undergone putrefactive degeneration; and the latest research in this direction certainly substantiates his claim.

Two hours after writing the preceding paragraphs, the writer was asked to help a new patient who was suffering considerably. There was neuralgic pain throughout the left side of the face, and a great deal of soreness in the region of the submaxillary lymphatic gland, the neuralgia of course indicating a congested vital pulp, and the inflammation in the gland a focus of infection. We suspected an upper molar, which had a temporary filling in it, of being the tooth with a congested pulp, and a lower molar which had a large silicate filling in it and appeared to be dead, of containing the focus of infection. Investigation, however, showed that the cavity in the upper molar was very shallow, and did not enter into the question; under the large silicate filling in the lower tooth (and

it was a very deep one) we found a vital and congested pulp.

Here was a case where there was sufficient infection in a vital pulp to affect the lymphatic gland controlling that region. How much better had it been if the operator who put in the silicate filling had first devitalized the tooth!—he would have had a sterile field in which to operate. Therefore if our good judgment dictates that a pulp should be devitalized, we must have the bravery to devitalize, and the courage to do it properly.

Now, just as lowered resistance will predispose to infection in a vital pulp, so the lowering of resistance in the periapical tissues will do the same thing, and there is food for serious thought in this fact.

USE OF DEVITALIZING PASTES.

Arsenic is one of the most penetrating tissue poisons, and should be used with great discrimination, if at all. There can be no doubt that the periapical tissues are often destroyed by the arsenical treatment. As far as the tooth is concerned, conduction anesthesia is the ideal plan for pulp extirpation. It is not always possible to apply pressure anesthesia, especially where the pulp is not exposed. Sometimes an application of Buckley paste or "velvo-phenox" (a similar and very satisfactory preparation which antedates the Buckley paste by a couple of years) will enable one to expose the pulp, after which pressure anesthesia may be used. However, there is always danger of forcing infection into the periapical tissues by this method of treatment.

When it is necessary to use a devitalizing fiber of the arsenic type, the writer prefers that manufactured by the Velvo Co. It contains so little arsenic, and that little is so well locked in chemical combination, that it can be sealed in the cavity with simple cotton and sandarac—in fact it is more effective when sealed in that way. A trying situation arises when the apical ends of pulps are not devitalized by the arsenical treatment.

In these cases it is not safe to again use arsenic; pressure anesthesia may force some trace of arsenic through the foramen, and other agents, such as silver nitrate or trichloracetic acid, are hopelessly inefficient. In these cases the writer uses the Buckley desensitizing paste or "velvo-phenox," of which a small quantity is placed in the canal with a broach, a piece of cotton moistened with formocresol is placed over it, and it is sealed with gutta-percha for about a week. There will be no pain, and seldom any pericementitis. This is the most efficient agent I have found in these cases. The treatment may be repeated if necessary.

Last spring, in a paper read before the New Hampshire State Dental Society, I stated that with the radiograph I had found lesions following this method of treatment. A study of further data reveals the fact that an abnormally large amount of filling material was forced into the periapical tissues in some cases—but the percentage was about one-half of 1 per cent., and this result may have been due to large foramina or less dense peridental membrane than normal. If we are going to fill our canals to the outer edge of the apical foramina we are going to "encapsulate" a certain percentage of root apices; it simply cannot be avoided.

Time may prove the use of formaldehyd-liberating preparations in this connection to be unwise, but the indications in that direction at present seem practically *nil*.

ROOT-CANAL INSTRUMENTATION.

The first requisite for canal instrumentation is accessibility. Do not ream root-canals through pinhole cavities; do not drill small openings through large fillings or gold crowns—remove them. Do not treat anterior teeth through small lingual openings at the cervical margins; make an opening approximating the size of the pulp chamber, so that it will not be left full of putrefying pulp tissue to discolor the tooth and infect the canal filling. If there is a curve in a canal, cut away the tooth structure in

such a way as to straighten it out. If there is a corner or wall in the way, cut it down. Remember always that the vital thing is to get a perfect canal filling; after that it will be time enough to worry as to what you will do with what is left of the tooth.

To get to the apex of a virgin root-canal is not as a rule very difficult. The trouble very often is that we start wrongly, and mar the canal. If we start the canal with a Gates-Glidden drill or a stiff reamer, the chances are that we may cut a niche somewhere in its walls, after which reaming becomes exceedingly difficult.

When the chamber is wide open and all overhanging structure removed, isolate the tooth and dry the chamber well. Then hold the electric mouth lamp, having unclamped the mirror from it, close to the cavity, at such an angle that you can see the whole interior of the chamber. Never *feel* for root-canal openings—*see* them. Now give the mouth lamp to your assistant to hold while a fine antalum or fine long-handled Young broach is worked into the canals—do this no matter how large they look—exploring them carefully to locate any curves that may be present. If these instruments will not enter readily to the approximate length of the canals, use the smallest size Young broach, short handle, and ream the canal very gently. When this broach has reached the apex use the next size; then enlarge the orifices of the canals for about one-eighth of an inch into the canal with the three sizes of Gates-Glidden drills; then use larger broaches of the Young or Kerr type, always remembering that larger sizes break more readily than the smaller ones.

In the treatment of blind abscesses, we find our most difficult instrumentation. A great many of these canals are almost entirely obliterated by very dense secondary dentin.

The Callahan sulfuric acid solution (30 to 50 per cent.) is a useful aid in opening such canals. First dry the canal with Johnson & Johnson absorbent root-canal points and compressed air. Apply the acid with antalum-beaked college pliers, or on a wisp of cotton as advised by Callahan, pumping it up with an antalum broach, and after *one* minute follow the sulfuric acid solution with bicarbonate of soda, saturated solution, pumping this up also.

A useful treatment for dressing very offensive putrescent canals or canals into which pus drains is a combination which the writer calls "phenol-iodid." It is a saturated solution of iodin crystals in pure phenol. It contains an extremely high percentage of iodin, and should be discontinued as soon as suppuration ceases, which will be after one or two treatments. I like to use this on a wisp of cotton in the canals, and a large pledget of cotton saturated with formocresol in the pulp chamber, sealing the tooth with gutta-percha. The formocresol aids by liberating formaldehyd gas. After suppuration has ceased, formocresol is used for perhaps three or four dressings, leaving them *in situ* for four or five days at first, and later lengthening the period to ten days.

ROOT-CANAL FILLING MATERIALS.

Let us now for a moment consider the subject of root-canal filling materials from a purely mechanical point of view. One requirement common to all materials is that they must be introduced into a dry canal. First dry the cavity, then the canal, with Johnson & Johnson points, place a small quantity of 70 per cent. alcohol in the chamber, and pump it into the canals. Then dry again with Johnson & Johnson points and hot air. The writer finds himself using the root-canal dryer less and less, for the reason that it must either be applied hot enough to cauterize, or else for a period of several minutes; it also is apt to go through the foramen in many cases and cause hemorrhage. When you think the canal is dry, go back to the Johnson & Johnson point as a test; if the apical tip of the point comes out dry, the canal is ready to fill. Remember that neither chloro-percha nor medicated paste (which usually is an oil) can be pumped into a moist canal.

From a purely mechanical standpoint

the writer objects to gutta-percha or chloro-percha for two reasons: (1) It shrinks on hardening, as has been proved by the experiments of Weston A. Price and by numerous radiographs; and (2) because it is not sufficiently adhesive to seal the canal. Recently the writer removed a gutta-percha filling which had been introduced two weeks before into a dry cavity previously moistened with eucalyptol, which will make gutta-percha adhere to almost anything. The patient chewed tobacco. The outer surface of the filling when removed was white and clean, but the entire inner surface was stained a bright yellow by tobacco. The addition of the rosin-chloroform solution (Callahan) will make the material more adhesive.

A good plan is to use first the rosin solution, then chloro-percha, then gutta-percha points. The two solutions are pumped to the apex with a broach. This combination shows much better in radiographs than the rosin solution and points alone. The greatest objection to gutta-percha is that it is non-germicidal, and absorbent; it absorbs serum, etc., and becomes very offensive.

THE AUTHOR'S TECHNIQUE FOR FILLING ROOT-CANALS.

With your permission I shall now describe my own pet root-canal filling technique.

The material I use is a medicated paste or, more correctly, a paste made up entirely of medicines, the formula of which is: Bismuth subnitrate (a white powder) four parts, iodoform one part; mix on a slab or in a mortar and add formocresol q.s. to make a paste.

This paste is placed in a glass-stoppered bottle with a wide neck. After a week or so it will dry out somewhat. Each mix is spatulated for a moment with a drop of formocresol before using. The proper consistence is that of a cream, just thick enough so that it will not run into a ball when taken up on the broach.

The canal having been dried, a very small amount of the paste is taken upon the smallest size antalum broach, which is very flexible and yet fairly stiff. The paste is carefully carried down one side of the canal and pumped at the apex until the patient feels it, or the tooth begins to ache slightly. This grumbling pain is caused by the formocresol, and will last from three to ten minutes. The writer has used formocresol in this way for seven years, with uniformly good results. There is very little or no pericementitis following the filling of the canal. Care should be taken not to trap air under the filling material. When removing the broach from the canal, keep up the pumping motion until the broach is all the way out of the canal. If the instrument is withdrawn in a single motion, it may draw the material away from the apex.

The entire canal is filled with paste, and the chamber filled with gutta-percha, and packed over each canal with small and large pluggers.

If a porcelain crown with a post is to be used, I first fill the apex with bismuth-formocresol paste as described above, pump in chloro-percha, and then pack in small-sized Canfield gutta-percha points (unheated) with Ivory curved root-canal pluggers, until the canal is about one-third filled. The filling is of course radiographed before the crown is set. This paste and chloro-percha unite nicely, and whenever the writer uses chloro-percha and gutta-percha, he starts with bismuth-formocresol paste at the apex.

This paste shows up well in radiographs; this is essential in any material, for no matter what material or method we use, we shall have to refill a goodly number, and some two or three times, before the perfect filling is achieved.

ASEPTIC AND ANTISEPTIC OPERATIONS.

The final phase of our operation is that which lifts it out of the realm of the purely mechanical into that of surgery, namely, the control and prevention of infection.

There are two forms of surgical pro-

cedure. One requires that micro-organisms shall positively be kept out of the field of operation, and is known as asepsis; the other eliminates by irrigation and sterilization any bacteria in the field, and is known as antisepsis. One cannot operate on a suppurating field or under conditions such as may be found immediately behind the line of battle, by purely aseptic procedure. Hence we have, for example, the Carrel-Dakin method of treatment of wounds so much used in the surgery of the present war, which is a conspicuous example of surgical antisepsis.

In root-canal procedure we have two schools of thought, two methods of procedure, which we might correctly call those of asepsis and antisepsis.

The advocate of the use of gutta-percha is usually also an advocate of asepsis. He will tell you that if every step of the operation is performed under *absolutely* aseptic conditions, no drugs will be required, and a neutral material like gutta-percha will, if sterile itself, fulfil every need. I believe this to be true except for the one important fact that gutta-percha is absorbent and soon becomes very offensive. I also believe that it is not reasonably possible to perform an *absolutely* aseptic operation in the mouth. What would constitute such an operation?

Let us apply to a root-canal operation the requirements upon which a surgeon would insist in performing a laparotomy. First we must have an operating room with tile floor and tile or painted walls and ceiling. There must be no carpet or rugs, no wall paper, no pictures on the wall, no furniture except such as can be washed, and no plush or leather or cloth covers on the operating chair. There must be no cotton or other waste thrown on the floor.

The entire outfit, room and furniture, must be thoroughly washed frequently, and no one must come into the room in street clothing. The operator and assistants must have a dressing-room, and change all outer clothing. The patient must be taken to a dressing-room and his clothing changed for hospital attire. Before entering the operating room the mouth and face must be cleansed with germicidal solutions. A turban of gauze must be wrapped about the hair to prevent a shower of germs upon the field of operation. A mask should then be fastened over the patient's nose for the same reason, and the rubber dam applied so as to cover the entire face, for the operator's fingers must not touch the patient's skin. The dam and cavity should be washed with iothion or iodin, and the patient is ready.

Meanwhile, the operator and one assistant have donned caps and masks and rubber gloves, in addition to their operating clothing, and have sterilized their gloves and arms. *There must also be an unsterile assistant,* for a radiograph may have to be held up for inspection, or a window closed, etc., *and the operator and sterile assistant must not touch anything unsterile.*

Of course it goes without saying that the instruments, cotton, gauze, napkins, cotton points, gutta-percha points, chloro-percha, and everything else used during the operation, have been thoroughly sterilized.

Now, if a surgeon performs an appendectomy under these conditions—and he would insist upon every one of them—and finds that he cannot remove all of the infected tissues, he resorts to drainage, irrigation, and dressings. In other words, he brings into his procedure antisepsis.

Do you think that if the surgeon were filling, even under these conditions, a root-canal which had been attended by periapical infection which he could not reach with knife or curet, he would be willing to discard drugs, and crowd into that canal a non-germicidal and porous material like gutta-percha?

But, someone may say, that only applies to cases of apical infection. Granted; but has it not been shown that exposed or even congested pulps may contain and probably usually *do* contain infection? And how many pulps do we remove which are not either exposed or affected by pulpitis?

But aside from that, and granting that

gutta-percha may be correctly used with this strictly aseptic procedure, do you think it would be feasible to perform dental operations under this strict definition of absolute asepsis? What would be the cost of a filling which required entering the canal three times?

Now, what constitutes antisepsis in root-canal procedure? There is a prevalent idea that it means careless procedure; that it disregards all aseptic precautions, and depends entirely on a dab or two of phenol or creasote.

May I take just a moment more in which to sketch a correct operation under antisepsis?

The dam should be applied or the tooth isolated with cotton rolls. The canals should be reamed to satisfaction. Dressings of formocresol should be sealed in the canal until there is reasonable assurance that the infection is cleared up. If the case is complicated by any manifestation of secondary infections, a culture should be taken to establish the sterility of the apical area.

The canal is then irrigated well with water, and fresh cotton rolls or dam applied, and the canal dried thoroughly and sterilized by pumping into it phenolsulfonic acid with an antalum broach. Bicarbonate of soda solution is then pumped into the canal, and if cotton rolls are being used, the cavity is packed tightly with cotton and the patient allowed to rinse the mouth.

Cotton rolls are reapplied, and 70 per cent. alcohol applied in the canals to dehydrate them; they are dried with absorbent points and hot air, and filled, as before described, with bismuth-formocresol paste, which is itself positively germicidal. Not only is any infection present in the canal destroyed, but we are bringing to the periapical tissues bismuth, a germicide; iodoform, a germicide; tricresol, vastly more efficient as a germicide than phenol; and a sufficient quantity of formaldehyd gas will be liberated to aid in sterilization, and to produce a stimulating effect on the surrounding tissues.

These are the two methods of procedure; it is for each operator to choose for himself.

125 Prospect ave.

Standardization of Root-canal Work.

By MILTON J. WAAS, D.D.S., Camden, N. J.

(Read before the Pennsylvania Association of Dental Surgeons, of Philadelphia. February 12, 1918.)

THE trend of all modern thought and work is toward standardization. It might also be said that as we approach standardization, we approach efficiency. This is also true in dentistry. Amalgams have been largely standardized, casting technique and cavity preparation being likewise examples of where we have emerged from confusion on to safe ground.

In no branch of operative work, however, is there greater interest or greater confusion at the present time than in root-canal work. It will therefore be my endeavor tonight to present this subject in such a manner that we may come to an understanding of what we really desire in our root-canal operations. This I believe to be of fundamental importance. After we once agree upon the necessities in root-canal work, we may build upon a solid foundation, step by step, the best method or technique to accomplish these. The requirements of root-canal work, I believe, fall under ten divisions, and I shall consider the subject under these ten divisions separately.

I. ASEPSIS.

We must use all possible aseptic precautions in all cases. Before such a society as this, it is not at all necessary to enter into a discussion of the desirability of this first requirement, or to go into a detailed description of the methods used in performing aseptic operations. Only a brief reference to this feature of the operation will therefore be made. The proper care of the mouth by spraying and painting the mucous areas encroached upon by our clamps, etc., should be constantly kept in mind, as well as the proper care of the rubber dam before and after application and the use of sterilized instruments, particularly broaches of any description. These aseptic precautions must also include the ultimate sterility of the canal and all filling materials to be introduced therein.

II. ANTISEPTIC PRECAUTIONS IN TREATING PUTRESCENT CANALS.

We must use in addition antiseptic and mechanical precautions in all previously putrescent or infected pulp conditions. That we should add antiseptic precautions to the usual aseptic precautions in all previously putrescent or infected pulp conditions in order to render the contents of the root-canal innocuous as they are removed is equally as obvious as the first requirement. By mechanical precautions I mean that care should be used during instrumentation not to force any of the canal contents through the apex of the root into the apical region.

III. OBTAINING FREE ACCESS TO THE CANAL.

We must obtain the necessary direct access to all canals at any sacrifice to the crown of the tooth. For this purpose radical sacrifice of the crown portion of a tooth is the height of conservation. We cannot perform perfect root-canal operations without direct access to the canal, and any false saving of the crown portion spells ultimate entire loss of both crown and root.

IV. THOROUGH CLEANSING OF THE CANAL.

We must remove all root-canal contents. If for any reason it becomes necessary to remove the dental pulp, we must remove it completely. Incomplete removal, whether due merely to careless work or based upon any method such as the Herbst method or pulp mummification or the recently advocated silver deposit method means, in the long run, only a gamble with the patient's vital resistance. If I were to hand any member of this association a tooth and ask him the accurate length of that tooth, he would probably take a pair of calipers and place one pointer on the root-apex and the other at the farthest extremity of the crown enamel. If this same tooth should be rendered transparent by the method or Adloff and Krause, or a vertical section made through the center, and I asked the length of the pulp of that tooth, he would probably keep the one pointer as first placed at the apex and close the other until it just touched the lowest extremity of the pulp chamber. This would represent its length, and this much we must cleanse thoroughly. That is, we must remove the contents to the outside of the apex. This is where the organic matter enters the root, and this is the point to which we must work; to fall short of this is to do incomplete work. The idea that we must work through the apical opening to its outside extremity is the discovery of Dr. M. L. Rhein, and is one of the most important ideas he has ever given to the dental profession. He insists upon the necessity for this, and we must acknowledge the scientific accuracy of it and pay heed to it in our operative practice.

The great majority of operators, while having no fear of other forms of surgical interference of much greater significance, have a great dread of encroaching upon the apical tissues. This is something that must be overcome. If it is done with care as to asepsis, no damage is done, and our work is definite.

Methods of removing the contents of the canal. Removal of the root-canal contents may be accomplished in several ways. The most effective method at present is by the use of alkalis or acids. I use sodium and potassium for the removal of the organic contents, and resort to acids for the removal of inorganic obstructions. However, as we approach the apical end, we should, if possible, rely entirely upon the former. As we use only microscopic amounts of sodium and potassium on our apexographer at each introduction, and as this material enters instantly into chemical combination with any organic matter it touches, the original chemical identity of each is lost, and no further destruction of tissue can occur. On this account we may safely go through the apical opening. With acids, however, we might have considerable destruction of tissue, as the acid is drawn up by capillary attraction and is not self-limiting in its action, as sodium and potassium is. The removal of all root-canal contents includes also the removal of all broken-off steel instruments, which are occasionally found left in as souvenirs of some former operation. Where it is impossible to remove such by mechanical means (which is often the case) I have found they may be dissolved out by the use of trichlorid of iodin (ICl_3). (See Figs. 1 to 5.) This is the only chemical, to my knowledge, that will attack steel rapidly and which with the proper technique may be used with safety. It forms ferrous chlorid and iodid when brought in contact with steel or iron, and both salts being soluble in water they may be washed out as formed. It is at the same time a most efficient germicide, being a combination of the two most used halogens, and I predict a wide field for its use.

V. REFILLING OF THE CLEARED CANAL.

We must replace with a filling material all tissues so removed. If these tissues are all removed, we have an empty canal or canals which will in time become infiltrated with blood serum, lymph, etc., and so will make an ideal culture tube for any pyogenic organism which

may be hemolytically deposited therein. Therefore our fifth requirement must be complied with. As we have removed the contents through to the outside extremity of the apex, we must fill to that same distance. Moreover, we have at the extremity a point where the pericementum does not cover the apex, and after pulp removal this small area must be taken care of and encapsulated by our root-filling material; or we have exposed cementum which may cause osteoclastic action, and this must be prevented as suggested.

VI. CHARACTER OF FILLING MATERIAL TO BE USED.

We must use only such materials to replace the tissues removed as are inert and insoluble in the tissue environments in which they are introduced. The only materials which I at present know to be *proved* inert and insoluble for this work are chloro-percha and gutta-percha. With these in combination, we may safely and correctly fill any canal that can be filled, with the assurance that they will work no destruction and will remain permanently.

VII. NO NOSTRUMS TO BE EMPLOYED.

We must use no nostrums for any of these purposes. The use of nostrums for any purpose in root-canal work cannot be too strongly condemned. It is not reasonable to suppose that any patent-medicine fakir would have knowledge that was not already in the possession of one or another of our related scientific professions, and if such should ever prove to be the case his product could very easily be analyzed, and its composition made known.

VIII. THE X-RAY AS AN AID IN ROOT-CANAL OPERATIONS.

We must use proper diagnostic means to determine that—

(*a*) *All such tissues are removed and replaced with a filling material.*

(*b*) *In all infected cases the surrounding tissues become and remain healthy.*

Perhaps you have noticed that my requirements are all general in character. I have endeavored to make them basic; in other words, to so state them that new methods will not affect their soundness. For instance, under our eighth division our diagnostic means are at present somewhat limited, and we may yet develop a means of fluoroscopic examination or transillumination which will supplant present methods of diagnosis, but *never* the necessity for proper diagnosis of the points mentioned.

(*a*) To be sure that all tissues are removed from the canal we must now depend, first, upon the tactile information we obtain during instrumentation, and second, upon a roentgenogram of the tooth obtained after inserting a sterile diagnostic wire. After removing the wire and filling the canal we then obtain another roentgenogram to see if the operation has been successful.

(*b*) In all infected cases we must take a subsequent picture to see if the former radiolucent area is approaching roentgenographic normality, and still later to see if it is so remaining. If in doubt after this method is used, one can always open surgically into the apical region and make a culture.

IX. SURGICAL INTERFERENCE.

We must resort to surgical interference where indicated.

(*a*) *Apicoectomy.* Where we have reason to believe from extensive apical necrosis that conservative treatment will not be successful, we may resort at once to apicoectomy. Or in some cases where, after careful conservative technique, the infection is not eradicated, or on account of too great a curvature of the root we could not properly fill it, we may resort to apicoectomy as a further means of eradication without loss of the root. After apicoectomy, however, we leave an area of cementum without pericemental covering, and therefore open to osteoclastic action; and as exposed cementum seems to be a special invitation to osteoclasts it would seem to be good technique to cover all this exposed cementum with

chloro-percha before closing the wound, thus absolutely preventing possibility of failure.

(*b*) *Exodontia.* As a final expedient we always have extraction and proper after-care of the socket to eliminate the infection.

X. SYSTEMIC CONDITIONS AND THE TEETH.

We must most carefully consider the condition of each patient, and the possible influence of our root-canal work upon the health. After all, our root-canal work is done only for the benefit of the patient, either to restore normal occlusion and masticatory ability or to remove or prevent some dental infection, and we ought to consider from beginning to end the influence of what we are doing upon the patient's health.

In cases where secondary systemic involvement is suspected or when a patient is referred for eradication of focal infection, a most complete record of the patient's general condition should be obtained before commencing operative procedure. Not only should the dentist understand the usual medical report, but if the dental profession is to accept the burden of responsibility which is being laid upon it by the medical profession, it must understand and be able to assist in the immunological reactions in diagnosis and prognosis. Dr. Rhein has already called attention to the value of the complement-fixation test. I wish at this time to call attention to other tests in which the dentist can be of great aid. The first is the anaphylatoxin test. This is an easily carried out test, and of great value in confirmation of the complement-fixation test. The dentist can obtain a culture from the infection present. This is incubated and isolated in pure culture. This antigen is then added to the patient's blood serum, incubated for one hour, and then injected into a guinea-pig. If the pig dies quickly it means that the patient's blood serum has elaborated the specific antibody which sets free the toxin of the organism in question, and the guinea-pig dies of anaphylaxis or protein poison. If the animal does not die it means that either the patient's blood has not elaborated the necessary specific antibodies, or infection has not become general. To determine which is the case the evidence of the other general tests must be considered.

The second test is the agglutination test. We obtain a culture direct from the dental focus. From this obtain a pure culture as before, and incubate with the patient's blood serum. If there is no agglutination obtained from this (that is, a minus report) and we have a minus complement and anaphylaxis report, this would be almost positive evidence that any infection the patient may be suffering from is not from the dental focus.

The dentist should be able to talk intelligently to the physician when consulted on such matters. He should, further, be the best able to interpret roentgenographic examinations of the oral tissues. With such a basis we shall have a better understanding of the importance of our root-canal operations and treat them with the proper regard.

In conclusion, I wish to recapitulate the ten requirements of root-canal work, so that you may have them together for consideration:

(1) We must use all possible aseptic precautions in all cases.

(2) We must use in addition antiseptic and mechanical precautions in all previously putrescent or infected root conditions.

(3) We must obtain the necessary direct access to all canals at any needed sacrifice to the crown portion of the tooth.

(4) We must remove all root-canal contents.

(5) We must replace all tissues so removed with a filling material.

(6) We must use only such materials to replace the tissues removed as are inert and insoluble in the tissue environments in which they are introduced.

(7) We must use no nostrums for any of these purposes.

(8) We must use proper diagnostic means to determine that—(*a*) all such tissues are removed and again replaced;

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

(*b*) in all infected cases the surrounding tissues become and remain healthy.

(9) We must resort to surgical interference where indicated: (*a*) Apicoectomy. (*b*) Exodontia.

(10) We must most carefully consider the condition of each patient, and the possible influence upon their health of our root-work.

I now show a few lantern slides demonstrating these principles as applied to the actual root-work in my everyday practice. We often hear the criticism that only single-rooted teeth are shown. I here show only cases of multi-rooted teeth, or in which more than one single-rooted tooth has been so filled in the same film, to prove that these cases are not selected ones showing only hap-hazard success, and further, that the same results are consistently obtained in the posterior teeth. I show in Fig 15 no less than eight root-apices properly filled, all in the one film.

Explanation of Illustrations.

Figs.

1. Shows broken off Gates-Glidden drill.
2. Drill dissolved out with ICl_3 and diagnostic wire in place.
3. Properly filled canal and large regeneration.
4. Properly filled second molar canals and broken broach in first molar mesial canal.
5. Broken broach dissolved out with ICl_3 and properly filled canals.
6. Canals opened through apices with wires in place.
7. Same canals properly filled. (Patient over seventy.)
8. Lower molar with defective canal work.
9. Same molar immediately after proper treatment.
10. Central canal opened through apex as evidenced by diagnostic wire.
11. Lateral in same condition.

Fig. 7.

Fig. 8.

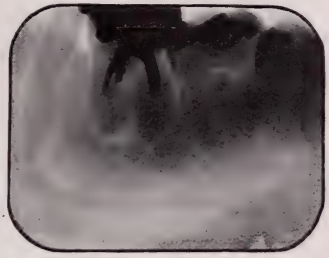


Fig. 9.

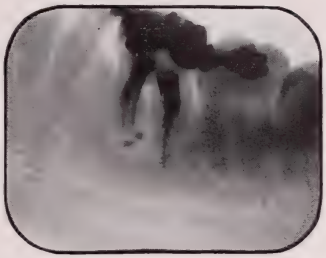


Fig. 10.

Fig. 11.

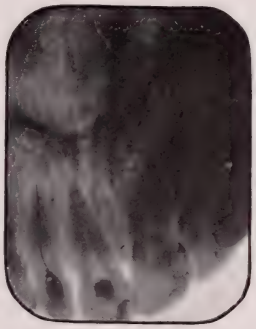


Fig. 12.

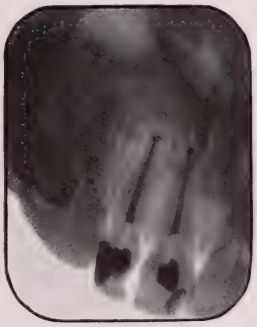


Fig. 13.

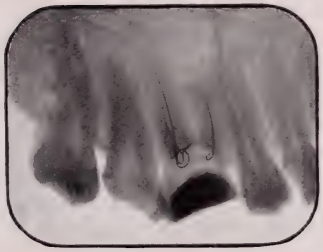


Fig. 14.

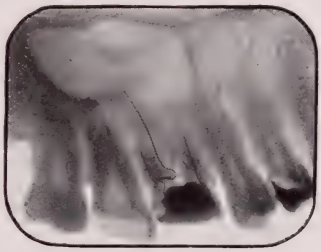


Fig. 15.

Figs.

12. Both canals properly encapsulated and evidence of beginning regeneration.
13. Diagnostic wires in place, but apices not yet opened.
14. Same as Fig. 13, but with apices now opened.
15. Same molar with all canals properly filled; also another molar and a bicuspid opened and canals properly filled since the second picture was taken.

---

315 S. Fifth st.

The Practice of Dentistry in the Army and in Civil Life: A Comparison.

By Lieut. K. F. SMITH, D.R.C., Camp Grant, Ill.

(Read before the Camp Grant Dental Society, February 15, 1918.)

I REGRET that this subject, so fraught with possibilities, has not been placed in more capable hands than my own. I am sure that my association with army dentistry is of too recent origin to enable me to make a very comprehensive comparison, and if, perchance, I wander somewhat from my subject, I ask your indulgence.

It is my belief that in choosing us from among the many dentists of this country who have volunteered their services our country has paid us the highest compliment possible for a dentist to receive. The dentist in army service, or, if I may use the term, the "army dentist," must be conscientious to the highest degree. His patients have no choice; they must accept his services, be it to their liking or otherwise. This factor does not hold true in civil practice, where the dentist who errs seriously in judgment, or is rough and unnecessarily cruel, quickly loses his practice, and finds he must take up some other field of endeavor.

As army practice in cantonments, the only type of which I am qualified to speak, brings us into contact only with the male sex—usually men of a very hardy type—and much authority has been placed in our hands in our relations with these men. I feel that it behooves us to watch ourselves closely that we do not abuse this privilege, and bring discredit to ourselves and to dentistry in general.

We have been selected and placed in our present positions, gentlemen, with a definite object in view—to place the mouths of the men in our respective commands in the best possible shape, with as great celerity as possible. Here again we find a line of demarcation. The best possible condition, in the army parlance, differs materially from that in civil practice. Estheticism must be almost entirely subordinated to the more important phases, masticatory ability and absence of all focal infection. You will notice, gentlemen, that I qualify my statement by the word "almost." I feel that no amount of time or sacrifice is too great to make in saving these infected teeth where the disfigurement would be marked, and our means of restoration unlimited, providing, of course, that the infection is ultimately curable. In all probability, in civil life, the mere mention of removing such a tooth would cause your patient to look elsewhere for dental treatment.

The assertion that in the army we are trying to tear down our practice and in civil life to build it up might easily be misunderstood. In the army, it is true, we are trying to tear down our practice by the rapid elimination of dental diseases in our commands. This principle also holds true in civil practice. It is the successful elimination of dental diseases from our patients that enables us to increase our practice.

One marked difference that I have noted is the coolness and courage with which these men of the army face dental operations; the same class of men six months ago, in my practice, did not show the same stoicism. I attribute it to their soldier's sense of pride, their good health, and disciplinary training.

Our Government has given us a very complete and efficient equipment to perform the work it wishes us to do, and there is no excuse for any but the highest class of dental treatment.

The situation often confronts us of badly broken-down bicuspid or molar teeth which in civil practice could be very nicely restored with a gold crown, or possibly an inlay. These teeth should not be lost; anchorage of some kind must be secured and the restoration made in some manner. Let us avoid, if possible, gentlemen, the accusation in future years, "If you had a toothache in the army, they pulled the tooth out."

I do not feel that there should be any marked difference between dentistry as practiced in the army and that of civil life, save in the limitation of our restorational material.

Good dentistry is good dentistry everywhere; the same careful consideration, tact, kindness, and human interest, so essential to success in civil life, will win success for dentistry in the army. For, after all, the final verdict upon the success or failure of dentistry in the army is going to be read in the future years, not only in the archives at Washington, but also in the hearts and minds of some two million or more free American citizens who at present constitute, or will shortly constitute, the American army.

A Preliminary Report upon the Temporo-mandibular Articulation in the Human Type.

By H. J. PRENTISS, M.D., Iowa City, Iowa,
ANATOMICAL LABORATORY, UNIVERSITY OF IOWA.

THE bony structures entering into the temporo-mandibular articulation are the glenoid fossa and the eminentia articularis of the squamous portion of the temporal bone above and the condyle of the mandible below. Between the temporal surface and the condyle is interposed a fibro-cartilage called the meniscus. Such a fibro-cartilage is present wherever is found one bone moving over a considerable surface of another —otherwise there would be a rattling around in the joint. Besides the mandibular articulation we may instance the sterno-clavicular and femoro-tibial or knee joint. In the latter case we observe the tibia moving around the condyle of the femur as the leg is flexed or extended. This articulation has two purposes, one to carry the weight of the body as we stand erect; the other, flexion of the leg upon the thigh in walking—a very different function indeed.

The inferior surfaces of the condyles of the femur are arcs of large circles, so large that they present almost a flat surface for carrying the weight of the body in the erect position (Fig. 3). The posterior surfaces of the condyles rapidly diminish, developing the arcs of circles of small radii (Fig. 4). This is to facilitate rapid flexion of the tibia upon the femur, as no weight is carried in this position. The tibial articular surfaces do not vary, so that the same tibial surfaces are in apposition to the arcs of the small circles as well as the arcs of the large circles. This would naturally result in great irregularity in the movements of this joint if nature did not provide some means to adjust the condition, which she has accomplished by developing the meniscus. If we study the early embryonic lower extremity, we observe that the mesenchyme at the site of the future knee joint differentiates into the

anlage of the fibro-cartilage, with two spaces separating it from the anlage of the femur and tibia (Fig. 1). This beginning fibro-cartilage becomes a true meniscus separating the femur from the tibia.

At birth (Fig. 2), we observe that centrally the cartilage has disappeared, leaving a circular opening; this is relatively a small opening as compared with the condition in the adult joint. Undoubtedly this early atrophy is due to powerful muscle pull, as of course no weight has been brought to bear on these surfaces. In the adult this meniscus has become a ring of fibro-cartilage, with a large central opening. This ring of cartilage is called the semilunar cartilage (Figs. 3 and 4). I think we can interpret this as due to the great pressure brought to bear in assuming the erect position; for, as we know, fibro-cartilage or any adult cartilage is non-vascular, and will therefore easily retrograde if undue pressure be brought to bear. This retrograde process in the knee joint is normal.

Fig. 1.

Fig. 2.

Fig. 3.

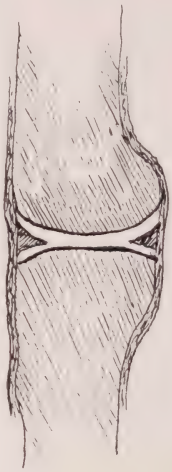
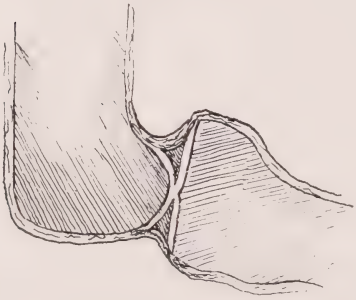


Fig. 1: Early embryo, showing meniscus at site of knee joint.
Fig. 2: Knee joint of child at term, showing foramen in meniscus.
Fig. 3: Adult knee joint. Leg extended, to show position of semilunar cartilage.

Fig. 4.



Adult knee joint. Leg flexed, to show migration of semilunar cartilage, thus keeping opposed surfaces in apposition.

It may be of interest to note the significance of this condition in this joint. With the tibia extended on the femur as in the upright position, the semilunar cartilages are pressed to the extreme periphery of the articular surface, and the large arc of the circle on the femur is in continuous apposition with the tibia plus this cartilage, which in a sense acts as a stuffing to keep everything snug. With the tibia flexed (Fig. 4) the small arc of the circle on the femur is applied to the same large surface of the tibia. Here again the analogy of the stuffing applies, for air-pressure forces the semilunar cartilages inward as the lesser sur-

faces recede from the greater, so that again continuous apposition is accomplished. We see therefore in the knee joint a retrograde absorption of the meniscus which is necessary to the normal function of this joint.

The sequence of events just followed in this joint may be traced in the mandibular joint, only here it becomes pathological with the loss of teeth. This joint differs from the knee joint in the fact that by the eruption of the teeth the surfaces are kept apart, and with their loss the muscle pull approximates these surfaces with atrophy of the meniscus. The condyle of the mandible glides over the eminentia articularis from its resting position in the glenoid fossa (Figs. 5 and 6). Therefore a meniscus develops.

Fig. 7 is a section of a fetus about five months old. Note the meniscus, and how well the musculature is developed. At birth, though the teeth have not erupted through the buccal epithelium, yet they are present, and the alveolar processes of the maxilla and mandible are large, so that the condyles are prevented from pressing against the temporal articular surfaces. Therefore the meniscus is not obliterated, but persists as a continuous fibro-cartilage. With the loss of teeth the alveolar process resorbs, and the condition of the semilunar cartilages is simulated. However, the fibro-cartilage of this mandibular joint does not show the marked thickening and thinning which we find in the adult (Fig. 8).

Fig. 5.

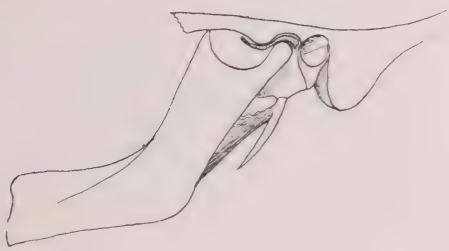


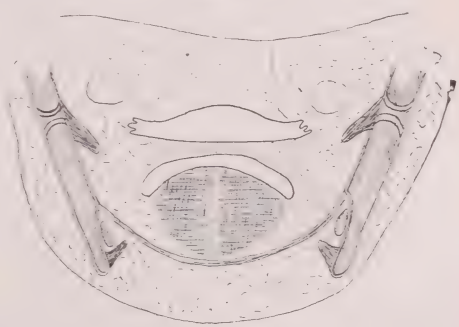
Fig. 6.

Fig. 5: Condyle in glenoid fossa. Lower part of stylo-mandibular ligament tense, to prevent backward displacement of condyle.

Fig. 6: Condyle over eminentia articularis. Upper fibers of stylo-mandibular ligament tense, to prevent forward displacement of condyle.

In the adult the molding of the meniscus is very pronounced (Fig. 9).

Fig. 7.



Coronal section of a five-month fetus, showing the mandibular articulation with the meniscus well formed. External pterygoid attached to this joint. Soft palate separating nasal pharynx from buccal cavity.

In the glenoid fossa the meniscus is thick, thinning out on the dorsal surface of the eminentia, but becoming thicker in front of the thrust of the condyle

(Fig. 9). This condition is due to the eruption of the teeth withdrawing the plasia due to the erupting teeth relieving the meniscus from pressure.

Fig. 8.

Fig. 9.

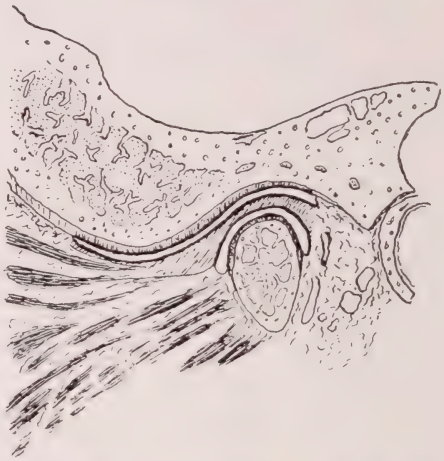


Fig. 8: Histological section of mandibular joint at term. The condyle is almost globular. The eminentia articularis is but a ridge. The meniscus shows little molding. Drawn to twice the normal.

Fig. 9: Histological section of adult mandibular joint. Meniscus well over the eminentia articularis. Marked molding on under surface. Upper head of external pterygoid attached to meniscus; lower head attached to neck of condyle. (Compare with photomicrograph, Fig. 18.)

Fig. 10.

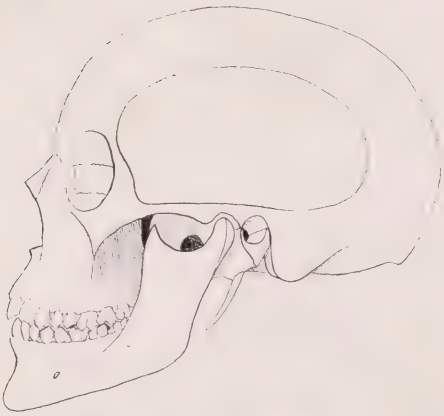


Fig. 11.

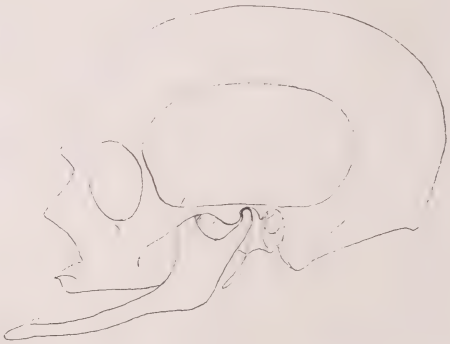


Fig. 10: Adult skull. Perfect occlusion. To show normal separation between condyle and glenoid fossa with jaw closed.

Fig. 11: Adult skull. Complete absorption of alveoli of the upper and lower jaws. To show condyle absorbed on its eminentia side, having developed a false joint at this point.

mandible from the maxilla, and therefore the condyle from the temporal surface. As early cartilage is relatively vascular, we may conclude that there is a hyper-

In a dry skull with perfect teeth (Fig. 10) the condyles are separated from the temporal surfaces when the teeth are in occlusion. A wax mold may be made

which is a perfect model of the fibro-cartilage, with the thick portion in the glenoid fossa and the thin portion over the eminentia. This beautifully illustrates how the teeth relieve the meniscus from pressure and consequently from atrophy.

EFFECT OF LOSS OF TEETH UPON THE MENISCUS.

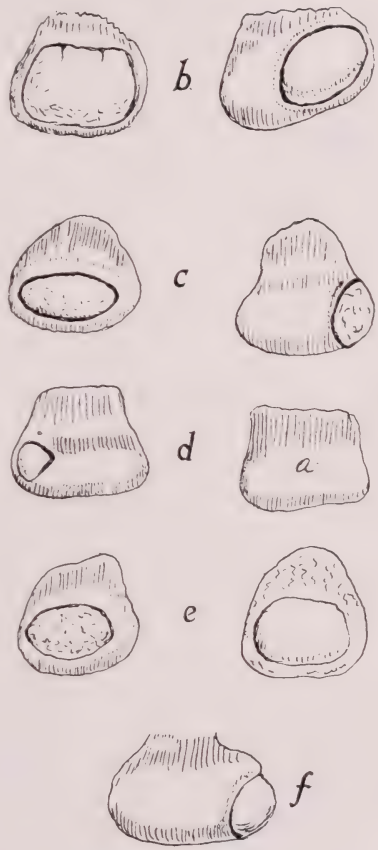
If, however, the teeth are removed, the condyle is pulled upward by the powerful musculature, and pressure is brought to bear upon the meniscus with a resulting atrophy varying from a small opening to a ring of cartilage in many ways resembling the semilunar cartilages of the knee. This pressure in old cases is carried to such a degree that not only is the hyaline articular cartilage covering the condyle and the temporal surfaces destroyed, but also the bones themselves show marked pressure atrophy (Fig. 11). Here the glenoid cavity is so excavated that the plate of bone between the condyles and the brain cavity is practically *nil*. (Note how the neck of the condyle has been excavated by pressure on the eminentia, indicating that there has been a loss of any gliding motion, and that the condyle only rocks in the glenoid fossa.)

This department has observed this condition of varying atrophy for some time, and this spring Dr. Richard Summa, professor of prosthetic dentistry and orthodontia in the dental college of the University of Iowa, visited the anatomical laboratory to carry farther our observations. He observed the condition of the teeth in the various cadavers, made an estimate of the pressure on the meniscus, and then we dissected the joint. In every case we found pressure atrophy where it was expected. Again, when loss of teeth was unequal on the two sides we found unequal atrophy of the two fibro-cartilages. Fig 12 shows sketches of a number of these cases.

ANATOMY OF THE TEMPORO-MANDIBULAR ARTICULATION.

As to the anatomy of the joint, with emphasis upon the meniscus, the meniscus extends from the anterior limits of the eminentia articularis backward to the Glaserian fissure, to which it is loosely attached by the capsule (Fig. 9). On its upper or temporal surface this meniscus

Fig. 12.



a, Intact meniscus viewed from above. *b*, Right and left from same specimen; to show unequal absorption of the two sides of the meniscus. *c*, Similar to *b*. *d*, Right and left from same jaw; showing absorption of but one meniscus. *e*, Similar to *b* and *c*. (Great necrosis of bone.) *f*, Single specimen.

presents a continuous smooth surface, permitting it to glide freely forward. At its limits it is attached to the temporal bone by a loose capsule. Its under surface presents a very different picture; it is divided into two portions, an anterior

part into which is inserted by strong fibrous fasciculi the external pterygoid, condyle of the mandible (Figs. 9 and 13).

Fig. 13.

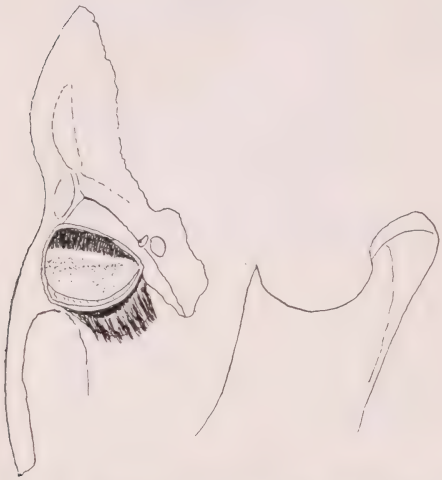


Fig. 14.

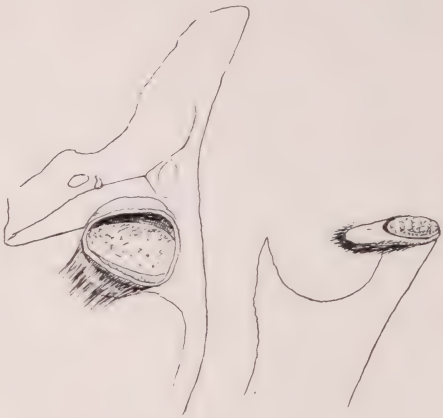


Fig. 13: Viewing meniscus and capsule from beneath. The condyle on right has been removed. (Normal.)

Fig. 14: View similar to Fig. 13. Here the meniscus in the glenoid fossa has absorbed away, leaving the capsule and pterygoid muscle attachment. To left shows the ring of the meniscus with much-eroded bone of condyle.

Fig. 15.

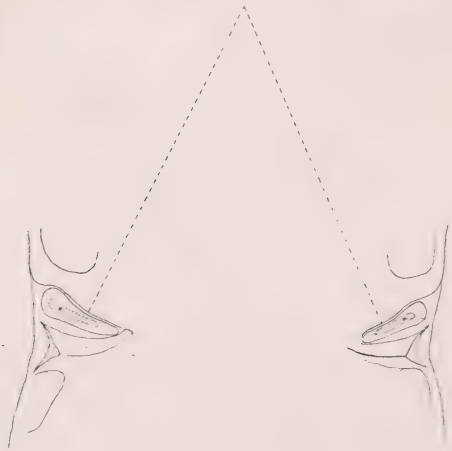


Fig. 16.

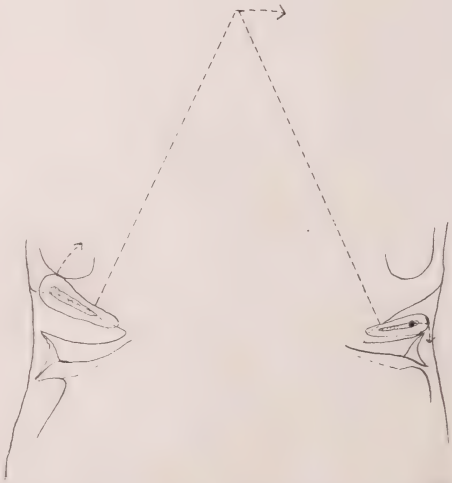


Fig. 15: View from below of glenoid fossa, eminentia, etc., with only the condyles fitting in snugly against the eminentia, but allowing free play laterally, backward. The apex of the triangle is at the symphysis mentis.

Fig. 16: Same view, but with condyle on the left moved on the eminentia but the lateral aspect of the condyle on the right rotated backward.

and a posterior, rather shallow smooth concave surface for lodgment of the

Note in front of the concave surface a thick portion of the meniscus preventing

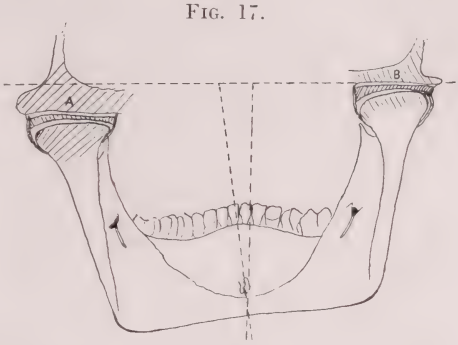
forward displacement of the condyle on the meniscus. The capsule at the neck of the condyle is attached to the periphery of this posterior smooth surface, thus confining the condyle to this portion of the meniscus, and this portion only (Figs. 9 and 13). The articulation between the condyle and the meniscus is therefore a condyloid joint. At the same time the meniscus glides forward, due to the direct pull of the external pterygoid. We can say, therefore, that the mandibular articulation is a gliding condyloid joint (Figs. 5 and 6).

In the specimens sketched (Fig. 12) some show a complete atrophy, excepting anteriorly, where the pterygoid is attached; others show a ring of cartilage persisting, of various degrees of thickness; from these they show changes down to a small opening. These cases of lesser atrophy, as Dr. Summa pointed out, begin at the lateral limit of the meniscus, and then they pass inward to involve the entire meniscus.

If we examine the condyle we note that the articular surface abruptly turns downward at the lateral aspect or where the condyle is broadest (Figs. 15 and 17). This is probably due to the tilting of the jaw during lateral motion, as the condyle of one side is depressed when passing over the eminentia (Fig. 17). Again, though the glenoid fossa is wedge-shaped, being narrow medially and broad laterally, and the condyle is also narrow medially and broad laterally, we note that there is considerable play posteriorly at the lateral limit (Fig. 15). That is, though the inner aspect of the fossa and condyle are closely approximated, the lateral aspects are not, the posterior surface of the condyle in this lateral region not being in apposition to the glenoid fossa in the region of the post-glenoid ridge (Fig. 15). This probably permits posterior displacement of the lateral portion of this condyle as the opposite condyle moves forward and inward over its eminentia articularis. In other words, the center of rotation is not at the extreme lateral limit of the condyle, but approximates the place where the neck of the ramus joins the condyle.

We therefore have a lateral short arm passing backward as the medial long arm passes forward (Fig. 16). The result is that a twisting movement is applied to this lateral portion of the meniscus, so that marked pressure is applied to this point with loss of teeth. This may account for pressure atrophy beginning at this lateral point.

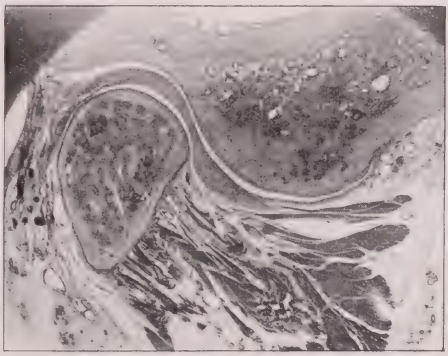
Fig. 17.



Schema. On the left, condyle depressed by eminentia articularis; on the right it is still in glenoid fossa. To show molding of the meniscus on the right and rotation of condyle due to tilt of the jaw.

This department is experimenting with dogs in an effort to determine the rapidity with which fibro-cartilage will atrophy under pressure. I hope to make a final report on this matter. As far as I can judge, these observations point out to the dentist that the moment pressure

Fig. 18.



Photomicrograph of section of adult mandibular articulation. (Compare with pen-and-ink sketch, Fig. 9.)

is brought to bear on the mandibular articulation by loss of certain teeth, immediate steps should be taken to prevent retrograde changes in the joint. If our experiments on the dog are successful, it will give the dental technician some knowledge as to the leeway given him in preventing loss of tissue.

As to the mechanism of the mandibular movements, I would refer you to an article by Dr. Frederic Lord, professor of anatomy at Dartmouth College, in 1913, who visualized them in the laboratories of the State University of Iowa. Under the present procedure, as I understand it, the dentist prepares his artificial dentures when there is a partial or a complete loss of the meniscus; the result is, that instead of the condyle being in apposition with a smooth gliding meniscus it projects into a cavity. The first condition may be likened to a man being drawn forward while sitting in a smoothly running buggy; the second condition may be likened to the result of a runaway, when the buggy is destroyed and the individual, entangled in the lines, is bumped over the ground. Lastly, and with hesitancy, I might say the dentist in making his plates seems to me like a mechanic who adjusts the lock of a door when the hinges are off.

The Importance of the Inter-articular Fibro-cartilage of the Temporo-mandibular Articulation.

By RICHARD SUMMA, D.D.S., Iowa City, Iowa,
PROFESSOR OF PROSTHETIC DENTISTRY AND ORTHODONTIA, COLLEGE OF DENTISTRY, STATE UNIVERSITY OF IOWA.

EVERY text-book on dental prosthetics devotes a chapter to the anatomy of the temporo-mandibular articulation, and many laudable efforts to devise a method of reproducing the condyle path upon dental articulators are recorded. Only the osseous structures of this articulation, however, have been given any practical consideration in the attempts to construct a mechanical apparatus which would imitate the complex mandibular movements. The soft tissues, of which the inter-articular fibro-cartilage is the most important, have been almost entirely disregarded. It is true that all textbooks mention and vaguely describe this meniscus, nevertheless one is reminded of the mention which occlusion of the teeth was given in treatises on orthodontia prior to the days of Dr. E. H. Angle's recognition and application of this anatomical factor as the basis of all orthodontic procedures.

Unfortunately, like other parts of the human anatomy which are of primary and almost exclusive interest to the dentist, the meniscus has been given honorable mention by anatomists in the description of the temporo-mandibular articulation, and there the matter rested. It is quite in keeping with the natural order of things that each specialty should seek and develop the knowledge pertinent to its own progress, and thereby strengthen itself. It is needless to state that the prosthetist's and the orthodontist's chances for studying this articular fibro-cartilage *in situ* are few and far between. It becomes necessary not only to obtain access to an anatomical laboratory, but also to elicit the assistance of an anatomist, and hence I believe the ef-

forts of Dr. Henry J. Prentiss, professor of anatomy at the State University of Iowa, will readily meet the appreciation of the dental profession.*

In a recent discussion relative to mandibular movements the disputants agreed that the temporo-mandibular articulation (and this must include all the structures concerned in this articulation) is originally shaped in response to the occlusion of the teeth. It was likewise agreed that malocclusion and loss of teeth produce corresponding changes in the temporo-mandibular articulation.

The investigation of Dr. H. J. Prentiss confirms these assumptions; furthermore, it calls attention to the fact that the meniscus is not the least important component of the temporo-mandibular articulation. The meniscus is that component part of this articulation which first receives the stimulus and also sustains the first impact to this joint resulting from the function of mastication.

Dissections of this joint clearly reveal the fact that following the loss of a few teeth the meniscus becomes thinned; following the loss of a larger number of teeth the meniscus is perforated, while following the loss of all teeth the entire upper surface of the condyle becomes denuded of inter-articular fibro-cartilage. Immediately following the perforation of the meniscus, absorption of the correspondingly exposed surfaces of the condyle and the glenoid fossa begins, and thus the change and reshaping of the temporo-mandibular articulation take place. It may not be amiss in passing to reiterate and emphasize the observation in the material thus far examined that the perforation of the meniscus always begins in the same location, namely, the external lateral angle.

From all that can be gleaned from the writings and discussions of the subject, the prosthetist and the orthodontist happily assume that this joint will readapt itself to the occlusion which their handicraft sees fit to establish—the one with artificial dentures and bridge work, the other with a corrected or improved occlusion of the natural teeth. However, practitioners of these branches of dentistry have frequently had occasion to wonder why such blissful dreams rarely come true. After enjoying the privilege of studying the anatomical material from which Dr. Prentiss derived his conclusions, one should be pardoned for wondering why the prosthetist's devices ever give reasonable satisfaction in any instance. At the same time one cannot help but give renewed expression of thankfulness to tolerant mother Nature for granting as many reasonably good results to orthodontic operations which involve a change in the temporo-mandibular articulation.

The prosthetist's efforts are expended on individuals of mature years when destructive processes of osseous structures are more the order of the day than constructive growth. If cognizance is also given to the fact that a non-vascular organ, such as this inter-articular fibro-cartilage, has no recuperative or reconstructive power, then we can be little short of amazed by the assertion that it is the prosthetist's privilege and duty to establish an articulation of artificial dentures irrespective of the temporo-mandibular articulation of any given case, because the occlusion of the teeth of artificial dentures decreed by the prosthetist will induce the matured structures of the temporo-mandibular articulation to grow as he wishes them to grow. The difficulty with this class of prosthetists has been that they based their arguments upon what they could do, because that is plainly visible, giving no thought to conditions encountered in the living subject which are not necessarily amenable to their mechanical efforts.

The prosthetist is at a disadvantage because his restorations must be adapted to abnormal condyle paths of infinite variations. In the largest proportion of cases of artificial dentures and bridges we must expect to deal with thinned or perforated menisci. It is a universal ex-

* [See paper by Dr. Prentiss entitled "A Preliminary Report upon the Temporo-mandibular Articulation in the Human Type," at page 505 of the present issue of the DENTAL COSMOS.—ED.]

perience that artificial dentures will permit of exerting only a small fraction of the force capable of being exerted by natural teeth. This has been attributed solely to the mobility of the bases upon which artificial dentures must necessarily be constructed. While this is unquestionably an important factor, may we not assume that the loss of power and masticating efficiency is also in part due to an instinctive hesitation on the part of the patient to exert more force, to avoid at least a feeling of discomfort, not to say pain? Occasionally, patients for whom apparently well-occluding bridges have been made will complain of a loss of masticating power or of an interference with the freedom of mandibular movements, or according to a recently published article, that the bridges "feel like stone walls." These complaints have been ascribed to a neurotic tendency in the patient, or to excessive peevishness, etc. However, such conditions are more correctly explained by the knowledge that in such cases the normally intervening fibro-cartilage has been irreparably destroyed, and as a result the denuded bone surfaces of this articulation have been forced into frictional contact by this so-called improved occlusion.

There are types of malocclusion which present a short horizontal ramus or body of the mandible, usually characterized by a receding chin. These cases suggest the necessity of carrying the mandible forward by means of intermaxillary force or by means of a bite plane, and the operator has proceeded to "jump the bite" in the endeavor to produce a change in the temporo-mandibular articulation which would permanently compensate for the shortness of the horizontal ramus.

Practical experience in such cases proves the impossibility of achieving the desired result, and a study of the anatomy of the articulation stamps such an orthodontic operation as questionable. Whatever improvement is possible in these cases is due to a correction of the occlusion of the teeth and the consequent molding of the body of the bone.

It is immaterial whether or not, at this time, the difficult task of constructing a device upon which the mandibular movements can be imitated has been accomplished. Nevertheless, a sincere appreciation is due the men who have intuitively or otherwise recognized the futility of placing the cart before the horse. Most deserving of mention in this connection is the work of Dr. Gysi.

The argument that some of the dentures constructed according to any of the methods which ignore existing natural conditions are successfully worn, or that fixed bridge work which has violated the important demand for mobility of the teeth has been paid for and worn by that same patient individual, reminds one of the argument that individuals whose wounds have been treated by applications of cowdung have survived in the struggle for existence. If scientific men were content to depend upon such reasoning it would indeed be deplorable

Collapse under Anesthesia due to an Enlarged Thymus Gland.

By ISADOR H. CORIAT, M.D., Boston, Mass.

From the Surgical Department of the Forsyth Dental Infirmary for Children.

IT has long been known that certain individuals, particularly children, with enlarged thymus glands react badly to anesthetics, infectious diseases, mechanical shocks, and to the injections of sera (antitoxin). Extirpation of the thymus gland in dogs may lead to a retarded growth of the bones, enlargement of the epiphyses, and a tendency of the bones to bend, in fact a condition which strongly resembles the osseous changes in rhachitis. The relation of the thymus gland to bony changes in children and the reaction of such individuals to narcosis is less well known. Intimately associated, also, with the occurrence of an enlarged thymus gland is the enlargement of lymphatic tissues elsewhere in the body. Cases of this type may show collapse or sudden death under anesthesia, even when no mechanical pressure by the enlarged thymus gland seems probable. These cases of *mors thymica* in children have been variously explained as being due to mechanical pressure, compression of the trachea, disturbances of the sympathetic nervous system, aplasia of the cardio-vascular system, etc., but none of these explanations have cleared up all the facts in the condition.

The following case is reported as indicating in an admirable manner the relationship of an enlarged thymus gland to rhachitic changes in the bones, to attacks of what may be termed thymic asthma, and finally to thymic collapse under light anesthesia.

L., a colored boy four years of age, was brought to the Forsyth Dental Infirmary to be operated on for adenoids and tonsils. The clinical record for anesthesia showed the following: Weight 34 lb.; height 3 feet; temp. 98.6°F.; pulse 100; respiration 24; hemoglobin 80 per cent.; blood pressure 96-44. The heart, lungs, and urine were negative. Some post-cervical glands were present. During the preparations for anesthesia the head of the child was not hyperextended, so that the collapse which followed could not have been due to a mechanical obstruction from an enlarged thymus.

After three inhalations of nitrous oxid-ether mixture, the patient suddenly ceased breathing; there was a sudden collapse, and breathing was resumed only after several minutes of artificial respiration. The operation was postponed, since a status thymo-lymphaticus was suspected, and to this end the patient was submitted to further study.

According to the history, the child had bronchitis when one year of age, and at this time he had three convulsions in one day. None have occurred since. Since then he has had several attacks of difficulty in breathing, with hoarseness (probably thymic asthma). Walking has been delayed on account of rhachitis.

Physical examination. A rather underdeveloped but fairly well-nourished negro boy, who was markedly rhachitic. The head was square, the epiphyses enlarged, and a rhachitic rosary could be felt on the ribs. Circumference of head 52 cm., biparietal diameter 15 cm., antero-posterior diameter 17 cm.; cephalic index 88.8 per cent. The palate was

normal, the teeth were typical for the age of four, and showed no defect of calcium metabolism such as might be expected in a rhachitic child or in thyroid or parathyroid deficiency. An umbilical hernia was present. The pupils and knee jerks were normal. There was no increase of subcutaneous fat.

Percussion over the chest in the region of the second and third interspace showed increased dulness, particularly to the right, where the dulness was about a finger's breadth in width. A radiograph of the chest disclosed a shadow on both sides of the upper portion of the sternum.

Both the percussion signs and the radiograph were extremely suggestive of an enlarged thymus gland, and this was further emphasized by the history of the asthmatic attacks, the rhachitic development, and the sudden collapse under light anesthesia. Since the opening of the Forsyth Dental Infirmary there have been a total of 2140 operations under complete anesthesia, and the above case was the only instance of collapse, thus demonstrating that, in our material at least, an enlarged thymus gland with the typical clinical symptoms is extremely rare.

416 Marlborough st.

A Type of Denture for Army Use.

By Lieut. E. H. RAYMOND, M.C., U.S.R.,

NO. — (PRESBYTERIAN U. S. A.) GENERAL HOSPITAL, BRIT. EXP. FORCE, FRANCE.

IN the early spring of 1917, in connection with work being done for recruits by the Preparedness League of American Dentists, the attention of the writer was drawn to the desirability of modifying the type of denture used in civil life to suit army conditions. At that time removable dentures were a bar to the admission of candidates for voluntary enlistment in the army, on the ground of the liability of such dentures to breakage, and with a view of obviating this objection the form of appliance about to be described was constructed. Since the arrival of the Presbyterian Base Hospital Unit in France, in June 1917, this appliance has been extensively used in the dental service of that organization. Dentures so made have proved to be practically unbreakable, accurate in adaptation, simple to construct, and their cost to be but a small fraction of that of the vulcanite and porcelain type.

The percentage of breakages of dentures under the conditions of trench life is high. The time necessary for the collection of extensive statistics has not been available, but the writer has been informed by officers of the British dental stations where denture work is done that repairs are a very important item, and even in this hospital, where such work is merely incidental, the number of broken plates brought in for repair has been notable. A recent census of 127 patients, taken at random in the wards, showed that 23 had vulcanite dentures, and of these 23 all but 7 were broken, 38 porcelain teeth having been lost, and in 3 the vulcanite base itself had been split. In several of the cases abrasions of the mucous membrane were present from the rough edges, and in one a well-marked case of Vincent's angina of the lip was found at the site of irritation from the broken plate.

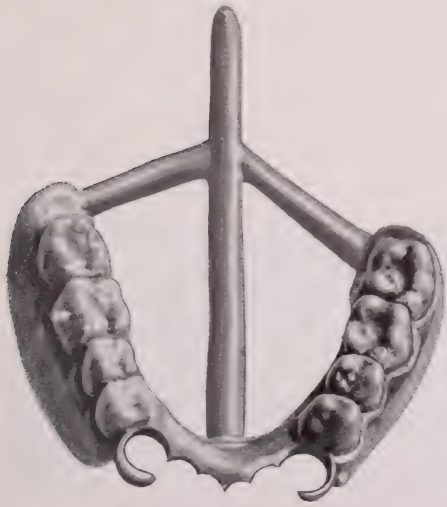
The fracturing of porcelain is often due to the hard biscuits served in lieu

of bread in the army ration. Many plates are also broken which have been removed from the mouth at night, the cramped space and the poor lighting of

Fig. 1.

tents and huts making such mishaps far more common than in civil life. The intentional breaking of dentures, with the hope of getting out of the line, like the self-inflicted wound, is probably a rare

Fig. 2.



occurrence. With the form of plate described it would be still rarer.

The denture in use in this hospital is made entirely of metal, by the casting process. Commercial aluminum has been found the most suitable material. It makes a sharp casting, has good edge strength for cusps of teeth, great tensile strength, withstands the secretions of the mouth, and is cheap, the present price in France being 8 fr. per kilo (about 75 cents per pound). An average all-metal denture weighs some 22 gm., making the cost of the metal some six or seven cents.

TECHNIQUE.

Clasps, where necessary, are soldered to tags in the same manner as for vulcanite work. From motives of economy nickel silver, heavy plate or half-round wire, is used for clasps, except in cases where considerable spring is required; in such cases clasp gold is used. An efficient substitute for clasp gold, at a low price, is a desideratum for army work.

Fig. 1 shows a very common case. The wax base-plate, made from pink paraffin wax, is molded to fit the model, the clasps are fastened to the base-plate with hard wax, and wax teeth, made as described below, are mounted in proper

Fig. 3.

articulation. With a suitable selection of wax teeth at hand this is a simple matter, the occlusal surface and base of the wax tooth being easily carved to form. At this stage the pattern is tried in the mouth, and any necessary change made in the articulation. Sprues made from one-fourth-inch strips of base-plate wax rolled into cylinders are then attached as in Fig. 2, and the piece invested and cast. (See Fig. 3.) Various casting devices have been tried, but for work of this kind the elaborate suction or com-

pression machines have been found quite superfluous. The apparatus at present in use consists of a piece of brass tubing, 5 × 5 in., in which the pattern is invested, and an enameled soapdish, which fits the tube loosely like a tin box lid and which is half filled with wet asbestos. The metal is melted with a coarse brush flame, and forced into the mold by hand pressure with the "lid." A similar device

Fig. 4.

Fig. 5.

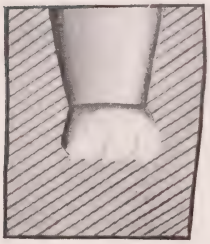
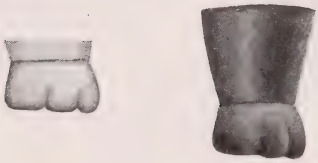


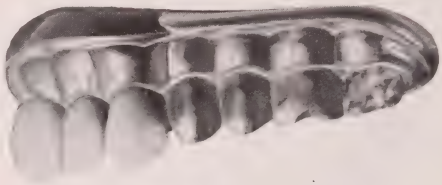
Fig. 6.



made from sections of brass shell cases has been described in the February issue of the *British Dental Journal,* and would doubtless prove satisfactory.

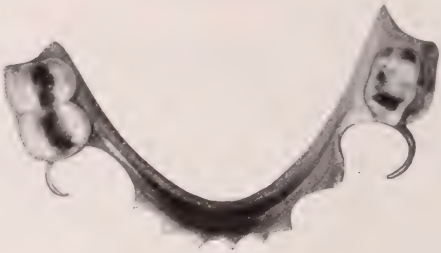
For the forming of the wax teeth, extracted teeth of suitable shapes are selected, and modeling composition molded to the roots, as in Fig. 4, in the shape of a truncated cone. From this a hollow mold is obtained in fusible metal, or still better, in Weinstein's artificial stone. Porcelain teeth, or the rubber teeth of the Sharpe seamless crown system, can be used as patterns; the molding flask in the latter outfit makes an excellent implement for forming the hollow mold.

Fig. 7.



Wax replicas of suitable natural teeth are preferable, as the cusping is sharper. The wax teeth (Fig. 6) are best made in

Fig. 8.



inlay casting wax, but ordinary base-plate wax can be used with good results. The base-plate wax drags more in carv-

Fig. 9.

ing, however, and is less satisfactory for the final articulation of the pattern in the mouth. When the molds have been

made, a stock of wax teeth can be poured in a short time, and the work can be done by untrained assistants. If artificial stone molds are used, care should be taken that they be soaked in water before pouring in the wax.

In attaching the wax sprues it is necessary that the side branches meet the main sprue at an angle, in order that gravity may assist in the flow of the molten metal. Full upper plates may be cast of the thickness of a single sheet of base-plate wax by running two, or for a large plate, four, branch sprues from the main stem to the heel of the plate.

After casting, the sprues are best removed with a mechanical saw, vulcanite files and engine stones being used for finishing. Carborundum powder on felt wheels is excellent for surfacing, and the metal takes a high polish with rouge.

All types of restoration have been made, including full upper dentures with all-metal teeth. The appearance of these dentures is an objection, although for war service that consideration should not be allowed to outweigh efficiency. A combination of six porcelain anterior teeth with cast-metal bicuspids and molars makes an excellent denture, where the time for vulcanizing can be spared. (See Fig. 7.)

In partial lowers, such as the case shown in Fig. 8, which would be a very fragile plate in vulcanite, and particularly for close-bite cases, such as Fig. 9, this type of denture is especially well adapted.

CORRESPONDENCE

More Anent Standardization.

To the Editor of the Dental Cosmos:

Sir,—Your editorial in the December issue of the Dental Cosmos regarding "Standardization" is much to the point, and I am in full agreement with it. I have often wondered why so much time, labor, and material was put into various instruments of all kinds of patterns which may have no sale, or even prove a loss. The nearer the dental profession approaches a standardized method of practice, the closer will it come to perfection.

I should also like to ask why the various methods of teaching in the dental colleges have not been brought nearer to a standard? A graduate who has his diploma and has passed a state board of examiners should be able to practice in any state without further examination. Either a state certificate should be recognized in all the states, or there should be one board whose certificate is recognized in every state. This is undoubtedly a question for the National Association of Dental Faculties, and I should very much like to see the present conditions altered.

To a foreigner the conditions referred to are most confusing, and give him the impression that there must be a varied lot of good, bad, or indifferent education in the United States—and such a question should not be raised. The English L.D.S. is recognized anywhere in the British Empire, and so it should be with the D.D.S. in the U. S. A.

Yours truly,

L. N. Seymour, D.D.S., L.D.S.

1 Sharia el Kadi el Fadel,
Cairo, February 15, 1918.

"Technique of Root Amputation."

To the Editor of the Dental Cosmos:

Sir,—The article by Dr. Prinz in the May issue of the Dental Cosmos is presented in his usual masterly style and has undoubtedly been read by hundreds of your readers with the greatest interest. There are a few points, however, in the paper that are not perfectly clear to the writer, and believing that scores of others must also be in the haze, this letter is written in the hope that Dr. Prinz will make them clear.

(1) After the cavity is sponged and appears "as clean as a billiard ball," why should its surface be painted with iodin? What does the iodin do to this perfectly clean and sterile surface?

(2) What action upon this iodized clean and sterile surface has the surgical powder?

(3) The writer says that when a broken instrument is in the canal, it is sometimes necessary to "push the obstructing agent back into the canal."

Let us now analyze the conditions obtaining. The root-canal and zone surrounding the root-end are filled with organisms, etc. The end of the root is cut off, "the obstruction pushed back into the canal," the necessary curetting is thoroughly done, and the wound is practically closed. The bony sac containing the granuloma has been rendered practically free from infection, but what of the infected canal opening into this sterile cavity? Why does not the cavity become reinfected at once from the infected canal? And suppose, later on, in attempting to extricate the broken instrument—which is always more or less difficult—it should be pushed out of the canal, and, infected as it is, lodge in the area beyond the root-end? As a matter of fact, if the instrument could be removed through the pulp cavity after the amputation of the root-end, why was it not done in this manner before the amputation?

This whole procedure appears so inexplicable that I am sure many of your readers will be glad of an explanation.

"Success" is merely a relative term, as is well known. Many a surgeon has been discussing the details of a successful operation while the friends of the subject were putting flowers on the grave. When, therefore, Dr. Prinz reports two hundred cases without a *single failure,* it surely is in perfect order and without the slightest disrepect to the writer that we ask, What constitutes success and what constitutes failure in this operation?

For thirty years the writer has been advocating the use of oxychlorid for the filling of root-canals, and so few appear to appreciate its advantages that it certainly is reassuring to have a man of Dr. Prinz' known ability indorse its use.

Apicoectomy, as it is most commonly called, appears to be of so very much interest to the entire profession today that it is hoped this discussion of Dr. Prinz' paper will be accepted in the spirit in which it is offered. With many men it appears to be a commonplace operation; many others are contemplating taking it up. Dr. Prinz' paper must appeal to the latter class, and with these doubtful points more fully explained by him, it should furnish all novices with all the instruction they desire.

Respectfully,

C. Edmund Kells, D.D.S.

New Orleans, May 3, 1918.

THE DENTAL COSMOS

A MONTHLY RECORD OF DENTAL SCIENCE.

Devoted to the Interests of the Profession.

EDWARD C. KIRK, D.D.S., Sc.D., LL.D., *Editor.*
L. PIERCE ANTHONY, D.D.S., *Associate Editor.*

PUBLISHED BY THE S. S. WHITE DENTAL MFG. CO., PHILADELPHIA, PA.

SUBSCRIPTION PRICE, including postage, $1.00 a year to all parts of the United States, Hawaiian Islands, the Philippines, Guam, Porto Rico, Virgin Islands, Cuba, and Mexico. Canada, $1.40. To other foreign countries, $1.75 a year.

Original contributions, society reports, and other correspondence intended for publication should be addressed to the EDITOR, Lock Box 1615, Philadelphia, Pa.

Subscriptions and communications relating to advertisements should be addressed to the BUSINESS MANAGER of the DENTAL COSMOS, Lock Box 1615, Philadelphia, Pa.

PHILADELPHIA, JUNE 1918.

EDITORIAL DEPARTMENT

Industrial Dental Service.

THE conspicuous progress which has characterized dental activity since our country entered the world struggle in the cause of democracy is without parallel. To provide for our military forces the benefits of dental and oral surgical service has not only taxed dental resources to the limit for the time being, but the demand, implying as it does practical recognition by our governmental administration of the indispensable character of dental service in the efficient conduct of the war, has stimulated wide interest in the larger problems of dental service and the importance of dental and oral conditions as related to the general health.

As a direct consequence of the growing interest in dentistry as a health factor and the direct bearing of mouth hygiene upon human efficiency, the question of the economic relations of dental

welfare service in the productive industries is a problem which is more and more engaging the attention of industrial interests. From philanthropic motives much has been done toward bringing dental service, especially in the larger centers, within reach of that large portion of our population that is financially unable to pay for dental service. Municipal clinics, public school and dental college clinics do much in taking care of the dental ills of those unable to pay a normal fee for dental care. The active propaganda which has resulted in the wide dissemination of knowledge of the importance of oral hygiene has produced results which cannot fail to accomplish much in improving the general health standard of our population.

It is to be noted, however, that the animating motive of the general oral hygiene propaganda was, in its initial stages at least, largely humanitarian and philanthropic. As experience began to bear fruit it soon became evident that reasons other than prevention and relief of suffering justified the claims of dental service for consideration as a public welfare measure. The relief of dental disorders was quickly seen to have eliminated a factor of physical disability which, particularly in the case of the unhygienic mouth, constituted a positive interference with physical and mental efficiency. Dental and oral hygiene work in public schools demonstrated the improvement which practical oral hygiene produced in the mental and physical efficiency of the pupils, and the relief of many cases of actual retardation due to dental defects among school children furnished conclusive evidence of the dental origin of their retardation. It is today well recognized that humanitarian considerations alone amply justify the encouragement if not the practical enforcement of oral hygienic measures among children of school age, but in consideration of the fact that by far the greater number of them are educated at the expense of the taxpayer, and that retardation by reason of physical or mental disability entails an augmented tax for educational purposes, the economic factor becomes an added and cogent reason for effective oral hygiene work among public school children.

It is this economic element that is stimulating an active interest in the industrial phase of oral hygiene work. The managers of business enterprises are sensitively sympathetic toward any and all plans and activities that give fair promise of reducing costs

and increasing efficiency. The conviction is growing that the working capacity of a body of employees as to both kind and amount of output is directly related to their physical and mental health standards. Hence the rapid growth of various phases of welfare service in connection with large business establishments. Among these, dental service is taking its proper place.

At the Congress of the National Safety Council held in Detroit in October 1916, Dr. Lee K. Frankel of the Metropolitan Life Insurance Co. of New York presented a report on "Dental Work in the Industries" based upon a survey of some twenty-seven establishments which provided dental service for their employees. Since that date the work has been largely expanded, though figures representative of the present stage of development are not at this time available. This activity has developed to a point where it could well profit by organization with a view to bringing together for conference and mutual improvement the whole body of dental surgeons who are specializing in this field.

Such an organization in medicine is already actively at work within medical lines. The American Association of Industrial Physicians and Surgeons was organized at Detroit in June 1916 in conjunction with the American Medical Association. One hundred and fifty members were in attendance. Its objects are to interest industrial physicians in a common purpose to put industrial medicine and surgery on a higher plane and to interest the general medical profession in the activities of industrial physicians and surgeons. At the 1917 New York meeting of the A. M. A. the membership of the American Association of Industrial Physicians and Surgeons had increased to three hundred and fifty. Its next meeting will be held in Chicago June 10th. In view of the common purpose involved it would seem desirable and practical to form a society of Industrial Dental Surgeons in affiliation with the general medical organization, dealing as it does with the broad question of the physical well-being of industrial employees.

To further the plan of organization herein suggested, the Dental Cosmos will be glad to receive from its readers the names and addresses of industrial concerns within their knowledge which have already provided dental treatment for employees as a feature of their welfare service, and the names and addresses of dental practitioners who are engaged in industrial welfare work.

As the public service relations of dentistry are developing so rapidly in such a variety of ways, it would seem to indicate the desirability of creating in our National Dental Association a division dealing with the Public Service Relations of Dentistry, having its subdivisions of military, school, eleemosynary, and industrial dental service. The present sectional division of National Dental Association work has outgrown its practical usefulness as the profession itself has outgrown its swaddling-clothes.

A Correction.

In the signature of Dr. C. W. Ratcheff of Chicago to his interesting communication, "A Case of Tooth Gemination," published in our April issue, page 300, his name was inadvertently printed "Batcheff."

Bibliographical

A Handbook of Antiseptics. By Henry Drysdale Dakin, D.Sc., F.I.C., F.R.S., and Edward Kellogg Dunham, M.D., Emeritus Professor of Pathology, University and Bellevue Hospital Medical College. Pp. 129. Cloth, price $1.25. New York: The Macmillan Co. 1917.

In this little volume of 129 pages the authors present in a very convenient form a rehearsal of the most approved chemical antiseptics as they are employed in the present war. In a general discussion of the members of the aromatic series (*e.g.* phenol), the heavy metals, aniline dyes, atomic oxygen (hydrogen peroxid), boric acid, iodin, etc., the authors present a more intimate study of the various members of the chlorin group. Of these, the chloramins receive the bulk of attention, as it is here that the authors have carried out their important research work. Of all the known chemical disinfectants, chlorin, freshly prepared and in the presence of moisture and a suitable temperature, possesses the greatest known germicidal power. Chlorin forms the active constituent of Labarraque's solution, Javelle water, antiformin (dental radicin), electrozone, (or dental meditrina), and of the antiseptic solution so successfully employed at present in the English and French war hospitals according to Dakin's formula by the Carrel method.

The great success obtained with Dakin's solution rests primarily upon the fact that a fresh preparation according to a specific method is employed, which, while acting deleteriously on the germs, does little harm to the tissue cells, as it

is a non-irritating isotonic wound antiseptic. All of these solutions have sporadically come to prominence in the past. While the laboratory reports, as far as the germicidal power of these solutions is concerned, appear to be highly satisfactory, the results of their practical application are not altogether so. It should be borne in mind that most of these preparations are irritating, and that chlorin solutions are labile compounds. All of these enumerated solutions lose their activity within a week or two, hence the disappointing results when commercial stock preparations are employed.

To overcome the difficulties encountered in the utilization of the unstable aqueous solutions of chlorin, Dakin devised chloramin-T, and finally dichloramin-T. The latter term is the abbreviated name of toluene-parasulfon-dichloramin. This compound forms a comparatively stable solution with certain chlorinated oils, and readily parts with its chlorin content in the presence of wound secretions.

It is to be regretted that the writers furnish so little information regarding the practical application of this new compound in hospital work. As the book is primarily intended for the use of physicians and surgeons, nothing is said regarding the use of dichloramin-T for the purpose of sterilizing infected root-canals and other dental purposes. It is here, however, that this new chlorin compound will achieve its greatest triumphs in the practice of dentistry, and the reviewer, from an extended clinical experience with it, predicts for dichloramin-T a most important place in the armamentarium of the dental practitioner.

H. P.

[Inter-Allied Dental Congress.] Congrès Dentaire Interalliés. Tenu à l'Ecole Dentaire de Paris du 10 au 13 Novembre 1916. Comptes rendus publiés par Georges Villain, Secretaire-général. Tomes I, II. Paris, 1917.

The subject matter of the reports is almost entirely devoted to the treatment and physiology of fractures of the mandible and the maxilla.

All the authors agree that it is essential to reduce the deformity and insert an appliance as soon after the injury as possible. On account of the injury of the soft tissues the appliances will vary. The second essential point is frequent irrigation of the entire mouth and wound under pressure.

Throughout the entire series of reports one is impressed with the number of appliances used for correcting the secondary contractures and deformities. It is especially noted that the correct primary appliances and treatment will greatly diminish the number of these deformities. There is no one method that is applicable to all cases, but the ingenious methods reported are very admirably described and should be more generally known. While it would seem unnecessary, it is noted in the reports that after bony union has occurred it is not advisable to attempt any method of correction without first dividing the bone.

An interesting point is that practically all the work has been developed upon the fudamental principles laid down by Claude Martin in his work. The cicatricial contracture of soft tissues is shown to be admirably treated by continuous pressure and massage.

These reports are the most complete it has been the reviewer's pleasure to

see. The volume is exceptionally well and fully illustrated.

G. M. D.

Books Received.

Books received are acknowledged in this column, and such acknowledgment must be regarded as a sufficient return for the courtesy of the sender. Selections will be made for review in the interests of our readers and as space permits.

"Practical Dietetics with Reference to Diet in Health and Disease." By ALIDA FRANCES PATTEE, Graduate of Department of Household Arts, State Normal School, Framingham, Mass. Late Instructor in Dietetics, Bellevue Training-school for Nurses, Bellevue Hospital, New York City; former Instructor at Mount Sinai, Hahnemann, and the Flower Hospital Training-schools for Nurses, New York City; Lakeside, St. Mary's, Trinity, and Wisconsin Training-schools for Nurses, Milwaukee, Wis.; St. Joseph's Hospital, Chicago, Ill.; St. Vincent de Paul Hospital, Brockville, Ont., Canada. Eleventh Edition, revised and enlarged. Price $1.75. Mount Vernon, New York: A. F. Pattee, 1917.

"Dental Electro-Therapeutics." By ERNEST STURRIDGE, L.D.S.Eng., D.D.S., Fellow of the Royal Society of Medicine, Member of the British Dental Association, of the British Society for the Study of Orthodontics, of the American Dental Society of Europe; contributor on Dental Electro-Therapeutics in "The Science and Practice of Dental Surgery," on Ionic Medication in Prinz' "Dental Materia Medica and Therapeutics." Second Edition, thoroughly revised. With 164 engravings. Philadelphia and New York: Lea & Febiger, 1918. Price $2.75.

"Elementary and Dental Radiography." By HOWARD RILEY RAPER, D.D.S., Professor of Roentgenology, Operative Technic, Materia Medica and Therapeutics at the Indiana Dental College, Indianapolis. Past Dental Surgeon to the Indiana School for Feeble-minded Youth. Member of the American Institute of Dental Teachers, of local, state, and National dental societies, of the First District Dental Society of the State of New York, and the Western Roentgen Ray Society; Associate Fellow A. M. A., Section on Stomatology. With over 500 illustrations. Second Edition. Adopted as a Textbook by the National Association of Dental Faculties. New York: Consolidated Dental Mfg. Co. London: Claudius Ash, Sons & Co., Ltd. Price $7.00.

"Injuries of the Face and Jaw and Their Repair, and the Treatment of Fractured Jaws." By P. MARTINIER, Professor in the Dental School of Paris, Dentist to the Seine Asylums, Hon. Director Dental School of Paris, and Dr. G. LEMERLE, Professor in the Dental School of Paris, Dentist to the Hospitals. Translated by H. LAWSON WHALE, M.D., F.R.C.S., Captain R.A.M.C., T. (formerly Capt. I.M.S.), the Oral Dep't, No. 83 Gen. Hospital, Br.E.F.; Visiting Surg. to the Throat, Nose, and Ear Dep't, County of London War Hospital, Epsom; Laryngologist to the London Temperance Hospital and Hampstead General Hospital. New York: Wm. Wood & Co., 1917.

"Technique and Scope of Cast Gold and Porcelain Inlays." With a Chapter on Endocrinodontia, or the Ductless Glands—Their Expression in the Human Mouth. By HERMAN E. S. CHAYES, D.D.S., New York City. With 372 illustrations. St. Louis: C. V. Mosby Co., 1918. Price $7.00.

"Gould and Pyle's Pocket Cyclopedia of Medicine and Surgery." Based upon the Second Edition of Gould and Pyle's Cyclopedia of Practical Medicine and Surgery. Second Edition, revised, enlarged, and edited by R. J. E. SCOTT, M.A., B.C.L., M.D., New York, formerly Attending Physician to the Demilt Dispensary and the Bellevue Dispensary; Author of "The State Board Examination Series," Editor of "Witthaus' Essentials of Chemistry and Toxicology" and "Hughes' Practice of Medicine," etc. Philadelphia: P. Blakiston's Son & Co. Price $1.25.

"Health by Instruction." An Effort in Favor of a Biologic Teaching. By LUIS SUBIRANA, Cirujano-Dentista, Professor in the Dental School of Madrid. English Translation by FRANK J. YOUNGER, D.D.S. Madrid: Sociedad de Artes Graficas, Fuencarral, 137. 1918. Price $1.00.

The title of this book does not properly indicate its contents. It is in reality an interesting and valuable expression of the author's views on the subject of education in hygiene.

Review of Current Dental Literature

[*British Dental Journal*, December 15, 1917.]

Some Observations on the Replantation and Transplantation of Teeth, with Special Reference to the Patho-histology of the Tissues of Attachment. By F. C. Wilkinson.

Recent interest in this old procedure has been signalized by the work of Marshall (see Dental Cosmos, 1918, p. 169) and Chiavaro (*ibid.* p. 261). Wilkinson prefaces this study with a concise historical orientation on the matter which is well worth reading by anyone interested. His original investigations on this subject were conducted with the object in view of establishing the method of fixation of replanted teeth to the surrounding tissue, with special reference to the function of the periosteum in these cases, and also to study the process of absorption which takes place. For this purpose monkeys (species not given) were taken as being the highest form of animal easily obtainable. Similar teeth were extracted from each side of the mouth, and after several days' interval were replanted under identical conditions, with the exception that in one side the tooth was completely stripped of its periosteum, and the other was left intact. After these teeth had been in position for about two months that specimen was obtained and the sections made. The technique of the operation is given in detail.

Under low power of the microscope these sections show that absorption of the roots has begun in both cases, but it is notable that the root upon which the periosteum had been left shows more absorption than the root from which it had been stripped. In fact, except for the slightly greater amount of absorption in one case than in the other, it is quite impossible microscopically otherwise to distinguish between the two roots replanted, the one with the periosteum left intact, and the other from which it has been removed. In the sections it is to be noticed that absorption is not equally distributed over the roots. In places the cementum seems to remain intact, and no evidence of absorption can be found, while in other parts it is proceeding rapidly. Wilkinson suggests that this condition is due to asepsis not being perfectly maintained, a very difficult proposition when operating in the mouth and with bony tissue.

The alveolus shows little sign of any absorptive process, but in some places new bone has grown out from the alveolus and fused to the cementum.

In summary: (1) The presence or absence of periodontal ligament upon a replanted tooth has no appreciable effect upon the mode of attachment.

(2) Absorption seems to take place to a greater or less extent in all cases, the immediate cause being large multinucleated cells, osteoclasts.

(3) Three kinds of attachment can be differentiated—(*a*) in certain portions of the root the alveolar bone is found directly united to the root; this osseous union probably occurs in places where the root and alveolar bone came in close apposition; (*b*) in other places attachment is obtained by ordinary scar tissue (this is the preponderating method of attachment); (*c*) in a small part attachment may be by long connective tissue fibers markedly simulating the normal periodontal ligament. At such places there is no absorption of the root. The establishing of this effort at a true regeneration is one of the most interesting points of the author's observations. This tissue has nothing to do with retained periodontal ligament on the replanted root. Under ideal conditions, which Wilkinson is unable to define, it might be possible to obtain such a form of attachment

throughout, which presumably would be as permanent as in the normal condition.

In this connection a letter from C. Lotinga in the *British Dental Journal* for January 15, 1918, p. 52, is of practical interest. A right maxillary second incisor with a history of caries and death of the pulp, root-canal treatment, and subsequent abscess, was extracted. Tissue paper, soaked in phenol, was wrapped around the root, its crown was cut off, and its hypercementosed apex resected. The periodontal ligament was stripped off *in toto*. A Richmond crown was fitted and a Dale's porcelain inlay was placed in the apex. The thus remodeled tooth was replanted in its socket just six hours after extraction. A splint was kept on for six weeks. The tooth remained perfectly comfortable for sixteen and a half years, when it was fractured by accident. Two-thirds of the root were left in position, from which to date—an additional period of three years—there has been no trouble.

Kells, in *Dental Items of Interest*, February 1918, records a case of replantation. At the present time, more than nine years since the operation, the tooth is apparently in perfect condition.

[*Journal of the Medical Association of Georgia*, Augusta, October 1917.]

Tumors of the Gums. By J. L. Campbell.

[*Surgery, Gynecology, and Obstetrics*, Chicago, December 1917.]

Giant-cell Epulis of the Upper Jaw. By Francis Reder.

[*Revista Odontologica*, Buenos Aires, January 1918.]

The Pathological Anatomy of Epulides. By R. Erausquin.

The first two papers deal with case histories and surgical intervention. The last paper is a rather pretentious survey of the patho-histology of these growths.

Campbell reports two cases. One was an angeio-fibroma of the gum in a white girl of sixteen years. The family and personal history was negative. About seven years previously there was first noticed a lump, about the size of a pea, on the labial surface of the upper left gum in front of the first molar. It gave no pain, and grew slowly until about one year ago, when it began to increase rapidly and bleed rather freely. The general health had been good until quite recently, when the patient began to lose flesh and feel ill. On examination was seen the pointed end of a reddish tumor protruding from between the lips and extending distal to the faucial pillars. It is raised above the teeth so that she cannot close her mouth. The teeth are irregular, decayed, broken, and very black. A cherry-red nevus is around the corner of the mouth. The tumor does not involve the cheek, but pushes it outward. The Wassermann was 4 plus. The blood showed 3 million reds, 7000 whites, and hemoglobin below 50 per cent.

Under ether anesthesia, the periphery of the entire mass was well infiltrated with a 0.25 per cent. novocain and 12 per cent. 1 : 1000 adrenalin in physiologic salt solution. There was very little hemorrhage. Recovery was complete. Microscopically the deep portion of the growth was fibrous, while its anterior and superficial parts were angeiomatous. There was no indication of malignance.

The second case was that of a colored woman, age sixty. The family and personal history was negative. About six years ago a small lump was first noticed on the labial surface of the lower right gum between the second incisor and the canine. There was no pain until about two weeks ago, when the growth began to throb as if it would burst. It was about the size and shape of a white-oak acorn, firm, and the color of the gum. It had separated the teeth between which it grew, and apparently had a thick pedicle.

Under local anesthesia the adjoining teeth were extracted, and a V-shaped piece of the gum with the tumor was cut away and the margin of the alveolus pinched off to insure complete removal. Microscopically the growth was a pure fibroma.

Campbell's article is illustrated with three portraits, not of special value.

The original part of Reder's paper is a case report. Four illustrative portraits of the "before and after" variety are introduced. The case was that of a woman, age fifty-two. Several teeth in the maxilla were loosened by a hen flying into her face. About one month later, a bad persistent toothache began. A tooth was extracted. There was prompt relief. Two weeks later she noticed a swelling on the upper gum near the right canine.

This was diagnosed as a "gumboil" by a physician. It was lanced, but slowly continued to grow, although without pain. About six months later the growth was so large as to force her to see a physician. The tumor was then occupying the greater part of the gum of the upper jaw. Most of the teeth were very loose, and either dropped out or were easily extracted. The mass was cut away by the physician within one month. After that the area was freely cauterized with silver nitrate. Within two weeks the growth had returned, and was increasing rapidly.

Finally the case was presented to Reder, about five or six months after the growth had first been noticed. Examination showed a venous-colored, spongy mass, about the size of a small tangerine, attached to the alveolar border of the upper jaw. Projections and irregularities were on its surface, and it extended on to the hard palate, protruding under the upper lip, which was pushed upward and outward. The mucosa of the alveolus was thickened, somewhat soft, and very red. The teeth of the maxilla were all missing. The sulcus between the teeth and the alveolar border was normal. There was no fetid discharge.

Operation. Incision was made through the mucosa, quite free of the tumor. With chisel, the whole of the alveolar border of the maxilla was removed. Bleeding was very free, but readily controllable under pressure. Recovery was uneventful. Four months after the operation the patient was fitted with a "palate plate with teeth." After the lapse of three years there was still no sign of recurrence.

Erausquin's article is illustrated by fourteen photomicrographs. His study is based upon ten specimens, the clinical histories of none of which are given. These may be grouped into three principal types—(1) giant-cell sarcoma with an osseous-fibrous skeleton, (2) fibroma durum or infiltrated osteofibroma, and (3) fibro-lymphoma or soft fibroma. The conclusions of his histological study are as follows:

(1) Possibly the giant-cell sarcomata arise from the dento-alveolar periosteum, previously irritated.

(2) The osteo-fibromata probably originate in the alveolar bone and its periosteum, although these tissues do not appear to participate directly in the production of the fibro-lymphomata, which quite possibly may come from the chronically inflamed corium of the gum.

(3) The indisputable benignity of these neoplasms, even those of the first type, is easily explainable when we remember the small cellular polymorphism of the giant-cell sarcomata, their good fibrous envelope, and the great development attained by their osteofibrous framework.

(4) For the present, in the extirpation of every epulis, except the fibro-lymphomata, it seems indispensable to insist on the extraction of the corresponding tooth or root, the resection of the alveolus, and the galvano- or thermo-cauterization of the bony surface when the growth is first discovered, in order to guarantee as far as possible against return, which is so frequent in this class of tumors.

[*Giornale Italiano delle Malattie veneree e delle Pelle*, January 1916.]

Primary Syphilis of the Gums. By Achille Breda.

This is a report based on three cases. The location is decidedly rarer than that of the lips and tongue. The sore appeared on the labial aspect of the gums; was painless although rapidly growing. There was the usual glandular involvement and subsequent rash. This condition has to be distinguished from swelling due to traumatic periosteitis and fibroma. The glandular involvement leads to confusion with neoplasms. The syphilitic lesion is characterized by its history of short duration and the fact that it is localized to the mucous membrane. The lesion is not usually large, is sharply demarcated, and of semilunar outline. Elevated, pedunculated, lobulated, or massive swellings are not likely to be syphilitic.

[*Hospitalstidende*, Copenhagen, January 17, 1918, per *Journal A. M. A.*, April 6, 1918.]

Alcohol Sterilization. By J. Christiansen.

Christiansen's extensive research seems to show that propyl alcohol has numerous advantages over ordinary alcohol for sterilization. Apparently this alcohol makes its way rapidly into the cells when the superficial tension of about 0.4 is reached. Once inside the cells, the alcohol induces a kind of fixa-

tion; *i.e.* in combination with the salt present in the bacteria it produces an irreversible precipitation of the protoplasm which signifies the death of the bacterium. Higher concentrations of alcohol do not have this effect, but merely tend to desiccate the organisms. The action of propyl alcohol in this dilution compares favorably with that of iodin, phenol, and other powerful disinfectants. The author urges the general use of *n*-propyl alcohol as a disinfectant for skin and wounds. When pure it mixes freely with water. Mixed with three times as much water, the superficial tension is 0.4. Inasmuch as ethyl alcohol is used so generally in dental practice for sterilization, it might be desirable to compare its efficiency and applicability under conditions of practice with that of *n*-propyl alcohol.

[*Dental Review*, Chicago, March 1918.]

Retention of Full Dentures. By Rupert E. Hall.

The principles which Hall enunciates are, as he himself states, those of Wilson, as given at page 168, February 1918 Dental Cosmos. Areal contact, peripheral bearing of the baseplate, and extension upon yieldable tissues are sought, to utilize to the utmost the physical forces of adhesion, cohesion, and atmospheric pressure in the retention of artificial dentures.

Recognition of these principles is especially called for in that type of edentulous jaws with poorly defined or excessively absorbed ridges, marked distortion or loss of facial contour, and abnormal or subnormal quantity and tone of the underlying and adjacent tissues.

To secure retention the taking of a perfect impression is the basic essential. Hall for this purpose employs an impression-tray compound, with a thin mix or two of plaster. In trimming the impression-tray-compound tray, advantage should be taken of the canine fossa, of the area just posterior to the molar process, and of the spaces on each side of the frenum of the tongue, so as to secure the maximum areal contact. Special attention is given to the margin of the impression directed toward the soft palate. Proper compression of the soft tissues is secured by a tracing of impression compound along this margin to dam back the plaster.

After taking the impression, the second factor in insuring retention is intelligent attention to the anatomical occlusion and articulation. In fact, to Hall, anatomical occlusion and articulation mean the arrangement of the artificial teeth so as to secure greater efficiency, and their aid in the retention of the denture. To secure these aims Hall insists that the teeth should have deep angular cusps, so mutually and purposively arranged that they shall guide the masticatory movements in a way as nearly approximating normal as possible. This is reminiscent of the inclined planes of the orthodontist. None of the teeth at present on the market satisfactorily meet this requirement.

A further factor in securing these aims is the establishing of the proper tooth length and bite. In this Hall varies from the usual teaching. Normally, when the teeth are occluded the lips are compressed and much shortened; conversely, when the lips are compressed and shortened in the edentulous patient, this position will more nearly give us the true tooth length and bite. Another detail in line with this which Hall advocates is that in articulating the teeth the incisors should be arranged to overlap (as normally) and ground to establish perfect opposing articulating edges and planes.

[*British Dental Journal*, February 15, 1918.]

Case of Chronic Nephritis: Uremia; Severe Hemorrhage from Gums. By W. Ashley Cooper.

The patient, a woman of thirty-three years, was admitted to the hospital for edema of the legs, albuminuria, and hemorrhage from the gums. At the age of four she had had scarlet fever complicated by nephritis, from which time until admission to hospital she had only complained of bilious attacks. Her mouth was in a very septic condition; her breath was very offensive, and blood could be seen oozing freely from the gingival margins. The gums were very anemic, and the patient had pyorrhea. Much tartar was present, which was removed. Various hemostatics were applied locally, but with no permanent effect. The coagulation time of the blood was markedly prolonged. Death ensued.

This case history is of interest in the light of Miner's article on the "Influence of General Health on Oral Tissue," in the March 1918 Dental Cosmos.

[*Journal of the National Dental Association*, March 1918.]

The Relative Efficiency of Medicaments for the Sterilization of Tooth Structures. By M. M. Brooks and W. A. Price.

This paper is limited to the sterilization of infected dentin and cementum as involved in root-canal infection following the death of the dental pulp. A very interesting historical survey serves to orient the reader in the problem, and furnishes a valuable bibliography.

The authors recognize that the following structures and conditions exist as important factors: (1) The root-canal to which the infection has access, and through which the infection can reach the dentin; (2) the dentin with its tubuli; (3) through the foramen or foramina the infection can reach the cementum, which probably can also be infected from the dentin; (4) the periapical tissues, which constitute not only the pabulum but also a locked area which may contain an infected culture medium, which may reinfect the cementum and dentin and the root-canal contents.

The experiments have been arranged in the following order: (1) A study of the ability of the medicaments to sterilize dentin and cementum under the most ideal conditions, irrespective of compatibility with clinical conditions; (2) the study of the ability of the medicaments to even retain the sterility of a medicated dressing when placed in an infected root-canal without the influence of a periapical infection; (3) the influence of a periapical infection upon these last-named conditions; (4) the ability of medicaments placed within the root-canal to sterilize infected dentin and cementum while these tissues are surrounded by a periapical infection, including a study of the areas of these structures that are most readily sterilized; (5) a study of the time factor, and (6) a study of silver-ammonium-formalin and Dakin solutions.

The results of the first series of experiments show that even under ideal conditions, where the medicament bathes both the inner and the outer surfaces of the infected tooth structure, and even where the mass of the medicament is relatively large and without compatibility for the surrounding tissues, the dentin and cementum were not disinfected except with a few medicaments, namely, formalin in all strengths (in the protocols this is given in percentages of formaldehyd—40, 30, 20, 10, 5, and 1) and chlorphenol. The great majority of results were negative and in direct contradiction to the general teachings and expectations in current dental practice. It is very difficult to destroy bacteria growing in dentin and cementum.

The conclusions to the second series of experiments are that the most radical disinfectant is dichloramin-T. This medicament in a concentration of 15 per cent. as used in these experiments gave 100 per cent. efficiency in all treatments, but also produced irritation of living tissue. A further observation on the lowest percentage needed for root-canal sterilization and the amount of time for the production of this condition will be continued. This drug may, in dilute solution of 1 per cent. or less, be both safe and efficient, but it is one of the most painful and destructive medicaments tried in practical cases. The members of the profession are warned never to place the 15 per cent. or even 5 per cent. solution of dichloramin-T in eucalyptol, its solvent, in any tooth or on tissues. (However, the newer solvent, chlorcosane, is devoid of this irritative effect.)

The third series of experiments shows that under the conditions specified above, the medicaments used—Buckley's phenol compound, dichloramin-T 15 per cent., formocresol, iodincreasote, iodin U. S. P., formalin U. S. P., phenol U. S. P., and oil of cloves 50 per cent. —are not ideal disinfectants. The interpretation of this experiment is probably that the penetration of the disinfectant is not sufficient to reach the remote and minute recesses of the tubuli. To find some disinfectant or method that will meet this requirement is the subject of the remaining experiments, although these are not yet completed.

The fourth series emphasizes that the efficiency of a medicament to sterilize *all* tooth structures should be the criterion of a disinfectant.

Experiments upon Howe's silver nitrate-ammonia-formalin method (see Dental Cosmos for September 1917) incline the authors to believe that a perfected technique will produce sterilization of the tooth structures

which are reached by the medicament in so short a time as ten minutes.

The experiments on Dakin's chlorazene and dichloramin-T give much encouragement for their use. They are, however, painful and destructive in over 0.5 per cent. strength. It must be remembered that this conclusion was drawn when eucalyptol was the solvent; the solvent chlorcosane eliminates this irritative action, so that percentages of dichloramin-T of over 6 per cent. may be used.

Among the general summary the points which are of special interest are—(1) The efficiency of a root treatment is greater a few hours after it has been placed in the tooth than after several days' or even one day's time; (2) all areas of cementum and dentin are difficult to sterilize, as well as tend to reinfection when the medicated root dressing is left more than a few hours; (3) the medicaments that are most efficient, namely, silver nitrate and formalin, are very objectionable, the former by its discoloration and the latter by its destructive and irritating properties, except when used very dilute and for a short time, and then quite efficiently. The signification of this last cryptic phrase is revealed in *Oral Health* for April 1918, by Price, in a description of the method of Cameron of Girard College, Philadelphia, for the sterilization of root-canals, which Price characterizes as superior in results to any other current method. Put 4 per cent. solution of formalin into the accumulated débris and use it as a solvent for washing out the pulp chamber and canals, but not undertaking to put any of it through or to the apex. Follow this with a 2 per cent. solution of formalin. The canals are not flooded, but merely moistened with this solution. Place a hot wire into the canals, and when the solution is raised in temperature to about 120°, which will not be particularly unpleasant to the patient, formaldehyd gas is given off rapidly and profusely, and passes into the structures of the tooth. Teeth treated in this way show a very high percentage of efficiency, and the laboratory tests of Price and collaborators have confirmed it as more efficient than the methods used in the past. All is done at one short sitting, and the canals are immediately filled. In this way the irritative after-effect of formalin is quite obviated.

[*American Journal of Clinical Medicine*, Chicago, April 1918.]

Causes of Bad Breath. By C. W. Canan.

Bad breath may be owing either to local causes or to systemic disease. Among the causes that are local there is dental caries; however, bad mouth odor more often is a consequence of decaying food particles adhering to the teeth. The breath is very characteristic in pyorrhea alveolaris. Bad breath may arise from diseased conditions of the nasal cavity; especially so in chronic hypertrophic rhinitis. It is very fetid in gangrenous stomatitis, and sickening in necrosis of the jaw. Diseases of the tonsils, larynx, and pharynx disagreeably influence the breath. In follicular tonsillitis and pharyngitis, the odor is due to decomposition of the secretions and particles of food filling the follicles, and is like that of fecal matter, while that of diphtheria is suggestive of putrefaction. Canan does not refer to the breath in cases of Vincent's infection of the oral mucosa, which is so characteristic as to be almost pathognostic.

Among the systemic diseases in which the breath odor is adversely modified, Canan mentions diabetes mellitus, glaucoma, pyemia, chronic alcoholism, gastric and intestinal disturbances, nasal and oral localizations of syphilitic infection, aphthous stomatitis, uremia, gastric and hepatic carcinoma, pulmonary abscess, and chronic bronchorrhea. In addition to the above it is known that fits of anger or great excitement may and often do produce fetid breath; the breath of some women is always offensive during their menstrual periods; there are certain individuals, seemingly in perfect health, who have a bad-smelling breath all the time, usually attributable to faulty elimination.

Canan briefly considers the treatment. He makes the serious mistake of outlining the treatment in cases where the cause is localized in the oral cavity, and inferring that the general practitioner is able to deal effectively with such cases. Where the physician by elimination has located the cause of bad breath in the oral cavity, there remains nothing legitimate for him to do but to refer the patient to the dentist. The converse of this is fully appreciated by the dentist.

The particular paragraph of the treatment

which may be of dental interest follows: In all ulcerative conditions of the mouth and fauces, a mouthwash or gargle or spray should be prescribed containing chlorazene in physiologic sodium chlorid solution. Another good treatment is to have the mouth rinsed with a dilution of specific medicine of thuja. Also ulcers should be painted with this thuja extract of full strength.

[*Journal of the American Medical Association*, April 20, 1918.]

The Transplantation of Bone. By W. E. Gallie and D. E. Robertson.

This article is a very sensible and well-illustrated one, of some interest to dentists from the standpoint of war surgery. The employment of this method in an operation on the jaw sequent to fracture with loss of substance is described, and also as applied in general in wounds of the face. They conclude with a statement of the principles that should govern the science of bone-grafting. It must be remembered that a so-called living autogenous bone-graft is alive only by virtue of the osteoblasts that are free on its surfaces and in the mouths of the Haversian canals. All the rest of the graft dies, and is absorbed. It owes its value in bridging gaps and in encouraging union of ununited fractures to the fact that during the process of its absorption the osteoblasts which invade it from its own surfaces and from the neighboring bones build up new bone to take the place of that which is absorbed, so that ultimately the break in the continuity of the injured bone is bridged by new and healthy bone. This established fact indicates at once the necessity for perfect contact of the graft with fresh, healthy bone in the fragments, and shows the reason for extending the graft well beyond the sclerosed extremities. It also shows the importance of using, as a graft, bone from which the periosteal and endosteal surfaces have not been removed, and it is on these surfaces that the greatest number of osteoblasts is to be found. For the same reason the graft should be made from bone which is as porous as the requirements of the case, in relation to strength, will allow. Hence the value of the rib as a graft, particularly if it has been opened up so that the osteoblasts of its interior can obtain the necessary supply of lymph. After the principal graft has been inserted as many small pieces as possible should be packed around it, the fragmentation increasing the surface area exposed, and hence increasing the number of surviving osteoblasts. In those cases in which the introduction of living osteoblasts is not an essential feature of the operation, the value of boiled bone must not be overlooked, as it possesses many of the virtues of the autogenous graft without some of its disadvantages.

[*Journal of the American Medical Association*, January 5, 1918.]

The Disinfection of Pneumococcus-carriers. By John A. Kolmer and Edward Steinfield.

In the Dental Cosmos for December 1916, p. 1425, attention was called to the marked germicidal action of ethyl-hydrocuprein upon pneumococci. At that time it was suggested that this drug might be of some benefit in the treatment of pyorrhea alveolaris, in view of the fact that pneumococci are found in pyorrhetic pockets along with the closely related streptococci. The report now to be considered further enhances the desirability of putting this proposition to test. The authors have studied the disinfection of sputum and the mouth with solutions of various cinchonics in a menstruum of liquor thymolis. Their experiments demonstrate that the latter solution alone in dilution of from 1 : 4 to 1 : 10 possesses some germicidal activity for pneumococci, and aids in disguising the bitter taste of cinchona compounds. This problem has been mainly approached from the laboratory side, employing both normal mouth secretions harboring type 4 pneumococci and the sputum of pneumonia convalescents harboring type 1 pneumococci. The pneumococcidal activity of the disinfectant under study was largely determined by mouse inoculation.

The systematic use of ethyl-hydrocuprein hydrochlorid (1 : 10,000) in a 1 : 10 dilution of liquor thymolis, twice or more daily, is not dangerous from the standpoint of toxicity due to swallowing portions of the drug, is not unpleasant (bitter taste readily removed by rinsing mouth with plain water), and may aid in ridding the mouth of virulent pneumococci. Similar solutions, incorporated in a dental cream, may be used for cleansing the teeth. For washing the mouth or gargling,

a solution is conveniently prepared after the following formula:

	gm. or cc.
Ethyl-hydrocuprein hydrochlorid or quinin bisulfate,	0.005
Liquor thymolis,	5.0
Distilled water,	q. s. ad 50.0

[*Bulletin of the Canadian Army Medical Corps*, Ottowa, March 1918.]

Infectious Ulcero-membranous Stomatitis and Gingivitis. By — Bowman.

Clinical and bacteriological examination was made of 1000 men in camp to learn (1) the number of men who cleaned their teeth carefully and the number who did not; (2) the number of men in each group showing Vincent's organisms present in significant number; and (3) the number of cases of clinically infectious gingivitis in each of these groups. There were 816 men with clean teeth; 314 (38.4 per cent.) showed Vincent's organisms present, but very few in number; 20 (6.4 per cent.) showed large numbers of spirochætes and fusiform bacilli, and were clinically positive cases.

Of the 1000 men 184 showed unclean teeth; 139 (75.6 per cent.) of these showed a few Vincent's organisms; 59 (32 per cent.) showed the organisms present in large number, and these cases were all clinically positive.

Bowman's conclusion is that not only are Vincent's organisms much more prevalent in mouths not cared for, but clinically infectious gingivitis is also much more prevalent, and corresponds practically with the bacteriological findings.

[*Journal of the American Medical Association*, April 27, 1918.]

Gonococcus Infection of the Mucous Membrane of the Oral Cavity. By J. M. Mayhew.

This is the detailed history of a single case. The patient denied venereal disease or recent exposure of any kind. The infection was apparent within twenty-four hours after he had had his teeth cleaned by a dentist. The whole picture presented a most severe type of mouth infection. Bacteriological examination showed an organism, identified with the diplococcus of Neisser.

The patient was sent to the hospital, isolated, and treated with a mouthwash of a saturated solution of thymol. The mouth and throat were swabbed daily with a 2 per cent. silver nitrate solution. Forty-eight hours after institution of treatment, the exudate began to disappear, leaving a raw, bleeding surface. At no time was there any odor from the mouth. Smears were negative on the twelfth day. Cultures were also negative.

PERISCOPE

Paper Points in Cleaning Root-canals.—Paper points may be passed along the canals with less danger of forcing dead material through the apex of the root than it would be possible to do with cotton wound upon a broach. Paper points also absorb moisture much more quickly and thoroughly, and give a better idea of the size and length of the canals.—D. H. Squire, *Journ. N. D. A.*

Polishing Material for Dentures.—When the denture has been filed and dressed with the scrapers, the surface may be smoothed very rapidly by the use of equal parts of pumice, emery, and silex of medium fine grit. By uniting these powders with equal parts of beeswax and hard oil the spattering and dust will be avoided and polishing will be a comparatively clean proceeding.—*Pacific Dental Gazette.*

Opening of the Pulp Chamber in Tender or Sore Teeth.—In caring for these teeth, frequently the patient cannot stand the pressure of instrumentation necessary to open the pulp chamber. To overcome this to a large extent I would advise the placing of a ligature of Cutter's silk around the neck of the tooth, and have the patient bring traction on the tooth, allowing him to pull as

hard as the pressure that is being exerted by the bur. In the case of the mandibular teeth the ligature may be placed over the head in order to pull up on these teeth. Another method that serves nicely is to place some modeling compound between the teeth to hold them apart, and then extend two wings of this material laterally, molding it into the interproximal spaces. When this splint is cooled and in place it will support the tender tooth during the operation, reducing pain to a large extent.—F. H. FRAHM, *Pacific Dental Gazette.*

Preparing the Stump for a Crown.—When preparing the stump of a bicuspid or molar for a crown by grinding with stones and vulcarbo disks, angles are made that are very difficult to reduce. This trouble can very largely be overcome by the use of cloth and paper disks treated with a little vaselin or lard oil to keep them from getting wet and useless. These disks can be compelled to curve, and will cut only on one side; also they are not nearly so liable to injure the soft tissues.—*Pacific Dental Gazette.*

Preparation of the Mouth Cavity Previous to Dental Operations.—In preparing the mouth cavity previous to a dental operation it is essential that the field of operation be as clean and free from bacteria as possible. In order to get a clean field the following procedures are suggested: (1) Mechanical cleansing of the teeth in the office before operating. (2) The use of a good spray of mouthwash. (3) Applying only a well-disinfected rubber dam, the tooth surface being disinfected before applying it as well as after.

If the above procedures are carried out one may be satisfied that he is operating in a clean but not a sterile field.—ADAH ROBERTA HOLMES, *Journ. Calif. State Dental Association.*

Root-canal Treatment a Specialty.—In view of our latest investigations and thoughts on this subject, there is little doubt that the treatment of pulpless teeth will soon become a well-recognized specialty. Many dentists are naturally unfitted for operations of this nature. As long as it is considered to be a duty of general practitioners they are forced to make an attempt to do what they realize they are not fitted for. It if were a well-recognized specialty, a large proportion of dentists would delightedly abandon such operations. The new standard of practice would receive a much earlier recognition if the subject were only discussed by such men as devote their time to the practice.—M. L. RHEIN, *Dental Items of Interest.*

Deaths from Cancer.—One woman out of seven and one man out of eleven, at the age of thirty-five, die of cancer. An average of 73,800 deaths occurred from cancer in the last ten years. In New York state in 1913, 9528 deaths were caused from cancer, nine times as many deaths as from typhoid fever. In twenty years the death-rate of cancer has increased 166.6 per cent., and if this death-rate continues for the next twenty years, it will be greater than the death-rate of consumption. Estimates indicate that from nine to twenty-six per cent. of all cancers are found on the tongue. Most of these cancers are on exposed surfaces where they may be discovered early, operated upon, and cured.—ALONZO M. NODINE, *Dental Summary.*

Vulcanite Tooth Replacement.—Several days ago the writer was shown a rather unique method of replacing a broken tooth in a vulcanite denture. After selecting a tooth of the right mold and shade, it is fitted into the recess of the broken tooth, with clearance for the pins, but without cutting the pink vulcanite. Then a horseshoe shaped loop several millimeters deep is cut in the vulcanite lingually to the tooth, leaving an island at the base sufficiently strong to resist a part of the strain that naturally will fall on this tooth. Now a small wire is twisted around the heads of the pins of the tooth, and fitted into the horseshoe-shaped groove. Lastly the tooth and wire are fastened and the case finished by sealing the repair work with zinc phosphate cement. This makes a rapid, easy repair that will last from six months to several years.—F. H. FRAHM, *Pacific Dental Gazette.*

The Mouth in a State of Health.—Were one to try to state the conditions that are essential to a state of health in the human mouth, they might be summarized under certain headings.

First would be placed occlusion. Why? Because occlusion not only is one of the most important factors in the maintenance of a state of health in the mouth, but we need to realize more than we do as a profession that occlusion is the mechanism through which normal function molds every anatomical detail of its entire structure. So during the whole period of development of the human mouth, occlusion, through the forces generated in function, is the means of development of the anatomical form and the most minute microscopical detail of every structure, and is one of the most powerful factors in the maintenance of health.—FREDERICK BOGUE NOYES, *Journ. Allied Dental Societies.*

The Basic Principle of Fixed Bridge Work.—Fixed bridge work which has proved to be the most successful and has rendered the fullest measure of service through years of vigorous usage is work which first of all has been made in accordance with the principles that it should be attached to or supported by one or more abutments when of straight alignment, and should receive additional attachment and support from one or more intervening abutments or piers when of curved alignment.

This law we believe to be based upon sound physiologic and mechanical principles; it is one which may be intelligently and definitely understood, and it specifically prohibits the employment of fixed bridge work in all cases where there is an insufficiency of anchorage teeth for proper support.

Fixed bridge work which has been constructed and applied outside of this principle is in some degree a failure from its inception, and if it is possible to compare failures, it is noticeable that the degree of failure seems to be in proportion to the extent of deviation from this principle.—A. J. Bush, *Journ. N. D. A.*

Pyorrhea Alveolaris.—In the March number of the *New York State Journal of Medicine* are the papers and discussions presented in a symposium on Infections of the Cervical Lymph Nodes at a session of the annual meeting of the Medical Society of the State of New York, held at Utica, N. Y., in the spring of 1917. Pyorrhea alveolaris was a subject thoroughly presented. An important practical idea in the treatment of this disease was offered by George E. Barnes, M.D., of Herkimer, N. Y., who said—"An important matter is the *prevention* of infection of the nodes and of other parts of the body. Apart from those cases in which operative treatment is required there are many cases of pyorrhea alveolaris and a few cases of tonsillar crypt infection in which hygienic practice may be sufficient. This applies more particularly, of course, to adults. After brushing the teeth subsequent to each meal, about a teaspoonful of water is taken into the mouth, and flushed around while suction is made on all infected parts of the mouth and fauces. If the pyorrheal pockets and tonsillar crypts are not kept clean by this procedure, operative treatment must be further considered."

Removing Root-fillings.—In removing faulty root-fillings or artificial obstructions, chloroform under pressure should be employed at first for gutta-percha, using either a pledget of beeswax or unvulcanized rubber to get pressure for a few moments; then, with the canal flooded with chloroform, take a fine smooth broach and endeavor to work down through or at the side of the gutta-percha, following the smooth broach with either a Donaldson barbed root-canal cleanser or a Kerr root-file of suitable size to remove the gutta-percha, repeating the process until the obstruction is passed. The canal then is washed with chloroform until the cotton is not stained by gutta-percha. In this washing, as well as the opening, every precaution is used not to force any of the contents of the canal through the apical end of the root.

Most root-canal pastes are soluble in acid, and when these are found, sulfuric acid should be used instead of the chloroform. When cement or gold has been used, the utmost caution must be employed in picking and cutting these out. As a cutting agent in these cases, I use the No. ½ round bur, which must be employed with the most painstaking effort if trouble is to be avoided.—W. G. Ebersole, *Dental Summary.*

Reliefs in Artificial Dentures.—If a hard area is sufficiently pronounced so that it can be easily detected with the light touch of the finger, and the surrounding tissues and ridges are even slightly soft or yielding, it is well to place a relief of 20 to 22 gage over the most prominent part, and another thickness of 28 gage over the entire area of the bone.

It is always well to relieve more than one thinks is necessary, rather than too little, for the relief will serve the double purpose of a relief (or to eliminate leverage during masticating pressure) and an air-chamber, both of which are valuable if properly placed.

The writer does not believe in an air-chamber as it has generally been applied for retention, for the reason that, if it overlies soft tissue, it is only a question of a few days when the tissue will be drawn into it, and it will be of no value for the retention of the denture; and in many cases it will be the cause of hypertrophied tissue or a hard growth that will ultimately act as a fulcrum on which the plate will ride.

If the relief is placed over a hard bony area, there is, as a rule, no tissue that can be drawn into it, and if made deeper than the bony prominence, it will act as a permanent air-chamber and relief.

Relief for hard rugæ. In many cases the rugæ are very hard and prominent, and it is important that a small instrument be used to scrape out the impression directly over each one. The relief should be very light, and may be sufficient to insure against the chafing of the base-plate when making up the trial plate.

Many plates have been condemned as failures simply because some one of the rugæ

has been rubbed off the cast, and the denture could not go up to its place. The principle is exactly the same as that involved in placing two pieces of glass together. The two pieces of glass will stick together well; then place one grain of sand between them and they may be easily separated.

It is the careful observation of the small and apparently insignificant points that has resulted in the great achievements of modern prosthesis.—SAMUEL G. SUPPLEE, *Dental Digest.*

Collecting Material for Bacteriological Examination.—In collecting material for bacteriological examination the greatest care should be taken not to contaminate the material. The following are very good methods for collecting material:

From acute abscesses. Wash the membrane thoroughly with a mild antiseptic mouthwash (the spray may be used). Apply formalin 1 per cent., 1 minute; alcohol 70 per cent., 1 minute; acetone, 1 minute; tincture of iodin, 1 minute, on the gums, to sterilize the field of operation, and as soon as the incision is made, introduce a sterile pipet deeply into the abscess to collect the pus. The pipet is then sealed and sent to the laboratory. Instead of a pipet a stick syringe may be used.

From chronic abscesses and granulomata of teeth which are extracted. (1) Remove the tartar or other deposits from the tooth and spray the mouth and teeth with an antiseptic solution, then scrub the mucous membrane in the region of the offending tooth as carefully as possible.

(2) Pack gauze on either side of the tooth to exclude saliva, dry the mucous membrane with gauze and compressed air, and apply formalin 1 per cent., 1 minute; alcohol 70 per cent., 1 minute; acetone, 1 minute; iodin, 1 minute, to the gums.

(3) The ligamentum circulare is then cut free from the tooth, after which iodin is employed again to destroy bacteria, which always lodge just under the mucous membrane.

(4) Extract the tooth and place the forceps holding the tooth on a piece of sterile gauze, with the apex of the tooth uppermost.

(5) Curet the alveolar socket with a sterile instrument to remove the granulations, and plant some of the removed issue under anaerobic conditions, and also under aerobic conditions.

(6) Immediately after the operation clip off the apex of the removed tooth with sterile rongeur forceps, drop it into another tube of ascitic fluid broth, and grow under anaerobic conditions.

From chronic abscesses and granulomata in apicoectomy. As this operation is performed under the principles of asepsis above described, no further precautions need be taken. The amputated root is immediately picked out with sterile instruments and dropped into a tube of ascitic fluid broth, and grown under anaerobic conditions. Other cultures are made from the removed granulation tissue and grown in ascitic fluid broth under aerobic conditions.

Immediate microscopic examinations are all made by making the usual cover-class preparations of pus obtained from acute abscesses, and from chronic conditions by smearing the end of a root or a piece of granulation tissue over the cover-glass.

The material gained from acute and chronic abscesses is inoculated on artificial media for special identification, and pure cultures may be made of the bacteria, which perhaps have already been recognized in a general way in a cover-glass preparation. The culture should be grown on various media and both under aerobic and anaerobic conditions. Anaerobic bacteria are especially hard to cultivate, and it is of greatest importance to innoculate the media without loss of time, so as not to endanger the vitality of the anaerobes.—ADAH ROBERTA HOLMES, *Journ. Calif. State Dental Association.*

Outline for Root-canal Technique.—(I) Radiograph to show number, shape, and direction of roots.

(II) Asepsis: (1) Wash or spray the mouth. (2) Paint gums and neck of tooth with tincture of iodin. (3) Isolate. (4) Wash the teeth included with alcohol. (5) Paint with tincture of iodin.

(III) Gaining access to canals: (1) Uncover entire pulp chamber. (2) Cut away buccal, lingual, and mesial walls to bring all canals into view. (3) Cut away walls to eliminate all curves possible.

(IV) Cleaning and enlarging canals: (1) XXX fine smooth broach (pathfinder) to ascertain length. (2) Large canals, barbed broaches to clean. (3) To remove old gutta-percha filling—xylol, explorers, spiral short broach.

(V) Small canals: (1) XXX fine smooth broach file. (2) XX fine smooth broach file. (3) X fine smooth broach file. (4) XX fine Kerr file. (5) X fine Kerr file. (6) XXX (8) X fine barbed broach to curet and en- XX fine barbed broach to curet and enlarge. (8) X fine barbed broach to curet and enlarge. (9) Fine barbed broach to curet and enlarge. (10) Fine Kerr file. (11) Apexographer or X fine barbed broach to remove

débris. (12) Sulfuric acid 30 per cent. as indicated; neutralize with sodium bicarbonate. (13) Enlarge until No. 34 plugger passes to within 2 mm. of apex.

(VI) Measurement wires and radiograph.

(VII) Dehydrating: (1) Alcohol. (2) Hot air. (3) Absorbent canal points.

(VIII) Filling canals: (1) Mark length of canal on plugger. (2) Measure size of foramen with absorbent canal point. (3) Eucalyptol to moisten canal. (4) Chloropercha, very small amount. (5) Cut cones, 1 to 3 mm. long, selected size. (6) Attach proper cut cone to No. 34 plugger and plug 2 mm. space at apex. (7) Continue until full; condense each piece thoroughly. (8) Radiograph.—E. D. Coolidge, *Journ. N. D. A.*

Filing and Curetting.—The process of enlarging the canal is one that requires great patience and much time. The first step is to pass the smallest size smooth broach to the apex of the root and make a mark or bend in the broach to indicate the length. This serves as a guide in the work following as to the length and direction of the canal, the broach being laid aside where it can be referred to constantly while working. Should the canal be a large one it is often possible to clean it completely with barbed broaches and prepare it for the filling, but where the canals are small and curve, as they frequently do in the mesial root of lower molars and buccal roots of upper molars, upper first bicuspids, and occasionally cuspids and lower incisors, it is necessary to work with great care to avoid accidents, such as losing the canal, or plugging it up with débris, or leaving part of a broach, which is most unfortunate. Wherever the finest smooth broach will pass it is possible to enlarge and fill the canal, unless an accident occurs, which should be avoided. Where the canal is extremely small and curved, the entire operation must be carried on by the up-and-down motion, with no turning or twisting of the broach around and around. Smooth broaches may be rolled between a medium coarse file and a block of wood to make a rat-tailed file of them in the graded sizes, and with the aid of 30 per cent. sulfuric acid the extremely small and curved canal may be enlarged and straightened enough to allow the smallest Kerr file to pass, which will cut quite rapidly. It is preferable not to use the acid with anything but smooth broaches, as it weakens them, and accidents may more easily occur. The acid should be neutralized with a saturated solution of sodium bicarbonate. This process of neutralization causes effervescence, and brings much débris from the canal. Every time the instrument is inserted in the canal, it should be passed to the apex of the root, and the canal enlarged throughout its entire length constantly to avoid losing the canal. The process of enlargement and curetment should be carried on progressively and consecutively with each size broach, one by one, until the larger sizes will pass to the apex. Should the operator become impatient and skip a size or two at a time, the result will usually be a failure, as the larger sizes will not pass to the apex, and soon a ledge is made where the canal curves, and the canal is lost, and rarely ever can be found again. The barbed broaches and files should be used alternately for curetting and raking out the filings and débris. This process should be continued until the canal plugger No. 34 or Kerr No. 1 will pass to within two millimeters of the apex.—E. D. Coolidge, *Journ. N. D. A.*

Root-canal Surgery With and Through Antiseptics and Disinfectants.—I believe this is safer practice than to depend upon what might be considered strict asepsis, when if all facts were known the word "strict" should not be applied. I hesitate somewhat to let this statement go out, for fear of being misunderstood. I like to see men make an honest effort to carry out asepsis in their work in every particular, especially where it is possible to introduce infectious material through an open wound or the canal of the tooth; but the point I wish to make is that asepsis as such is not necessarily essential, though very desirable, for the success of our root-canal work. As you know, I use phenolsulfonic acid in my technique of removing pulps from teeth and cleansing the canals. Surely, while I am working with and through this agent in the canal of the tooth I am working under antisepsis at least. When the canal is cleansed, I seal in with both temporary stopping and cement a dressing of eucalyptol compound; thus again I am using an antiseptic. When at the subsequent sitting I fill the canal, I want to be certain, if I use cotton-wrapped broaches, that the cotton thereon is sterile. Here, more than at any other sitting, up to this point in this work, we need real asepsis, especially if we use, as so many do, cotton-wrapped broaches. As a matter of fact, the canal may be filled properly without using cotton on any of our broaches in most cases if eucalyptol compound was the remedy last sealed in the tooth. If this is done and we do not use cotton, we may again depend upon antiseptics and disinfectants rather than asepsis.—J. P. Buckley, *Dental Items of Interest.*

HINTS, QUERIES, AND COMMENTS

A Dental Anomaly.

THE accompanying illustration is reproduced from a photograph made for me by Dr. M. H. Cryer, of a specimen showing an anomaly of formation that I have not

found anywhere described in dental literature.

The tooth was sent to me some years ago by a colleague whose letter I have lost and whose name I have unfortunately forgotten. Note is here made of that fact in the hope that the sender may recognize the illustration and thus be able to supply the clinical history of the case.

The specimen was an upper canine of unusually large dimensions. Its abnormal size led the operator to break open the tooth in order to determine if any peculiarity of development would be brought to light by an examination of the interior formation of its pulp chamber and canal. The crown portion represented in dotted outline was broken into a number of small fragments, which were not saved, but the root portion which was sent to me revealed, as shown in the half-tone illustration, what appeared to be a diminutive canine lodged in the root-canal and adherent throughout its entire length on one side to the canal wall. The inclosed canine approximated in general form that of the tooth in which it was lodged, and its most striking feature was the normal appearance of the enamel covering of its crown portion.

It is difficult to account for the genesis of this inclosed growth except upon the hypothesis that it arose from an invagination of a portion of the dental follicle including some portion of the enamel organ, on the same principle that dermoid cysts arise from invagination and inclusion of portions of the blastoderm within the body of the organism.

Miller* has described a case of what might be termed inverted enamel formation in an anomalous canine, but his description does not indicate more than a partial invagination of the ameloblastic tissue which did not result in such a close approximation to a complete crown covering as the case here recorded.

EDWARD C. KIRK.

* "A Study of Some Dental Anomalies with Reference to Eburnitis," DENTAL COSMOS, vol. xliii, 1901, p. 852.

OBITUARY

Dr. Arwed Retter.

[SEE FRONTISPIECE.]

DIED, Monday, February 25, 1918, at his home in Utica, N. Y., in his seventy-first year, ARWED RETTER, D.D.S.

Dr. Retter was born in Stuttgart, Wurttemberg, Germany, July 6, 1847. He received his early education in Stuttgart, and at the age of fifteen years he went to London, England, and thence, after a few years, came to America. Shortly after his arrival in this country he became interested in dentistry, and entered the Pennsylvania College of Dental Surgery, from which institution he was graduated in 1878. Immediately after his graduation he opened an office in Utica, N. Y., where he continued to practice until the time of his death.

Dr. Retter was quite successful in the practice of his profession, and soon built up a large practice in Utica. He was for five years president of the Utica Dental Society, and was also a prominent and active member of the Fifth District Society and of the Dental Society of the State of New York.

Dr. Retter was of a somewhat retiring nature and went little into society, but every circle in which he moved was graced and improved by his presence. He loved the company of choice friends and people of quiet tastes who were inclined to look for the better things in life. Himself refined and educated, a deep thinker and a man of superior judgment, it was natural that his home should be the center of his thoughts, and that he should enjoy it with the members of his family and those intimate friends who were privileged to come within his circle.

He was for many years an active member of Calvary Church, and for some time served on its vestry. He was vice-president of the men's club of that church, and took a deep interest in the activities of the club.

By close application and patient study, Dr. Retter had established for himself an enviable reputation in the dental profession, and was regarded as one of the most skilful dentists in New York State. There were few dentists in the state better known or better liked. He stood for the best in his line of endeavor, and always strove to uphold the high standard of his profession. His death will be widely and sincerely mourned by hosts of friends and acquaintances throughout the state.

Dr. Retter was married in 1881 to Miss Hattie J. Hollingworth of Utica. He is survived by his widow and two daughters, two brothers, one in Germany and one in England, and three sisters.

The funeral services were held from his late home, and interment took place in the Forest Hill Cemetery of Utica.

Death of Dr. A. R. Eaton.

WE regret to announce the decease of Dr. A. R. EATON of Elizabeth, N. J. A full obituary notice of this eminent practitioner, with portrait, will be published in our July issue.—ED.

Army and Navy Dental News

Army Medical Corps.

The War department has not yet promulgated its decision, based on the opinion of the Judge Advocate-general of the army, in regard to the strength of the regular establishment in its relation to the numbers in grades of the commissioned *personnel* of the regular medical corps and the regular dental corps. Consequently, commissions of officers due for advancement in the latter branch have not been signed, although the officers are considered as occupying positions in the grades to which they were recently promoted on account of the increase in the dental corps. There is therefore nothing special to record in the matter beyond what has been published in these columns. In the meantime, certain promotions have been announced among officers of the Medical department. An important conference will be held during the coming week between Medical department officials and representatives of the medical colleges in order to come to some understanding in regard to the acceptance for military service of professors and instructors of those institutions. There has been a disinclination to bring into the service members of the profession who are employed in the education and training of medical students, on the theory that such educators are fully meeting the demands upon them to a greater extent than if they, individually, were commissioned as reservists. Some of this class, however, are desirous of separating themselves from the schools if such a connection is to prove a handicap, while the college authorities apprehend that such a draft on the *personnel* of the faculty can only be detrimental to the system of training young men for the profession, with its direct influence upon the list of those who would ultimately be available for military service. Some doubt is expressed as to the efficacy of any arrangement that may be made, since in the end everything depends upon the individual, and regardless of any agreement an instructor will always have the privilege of severing his relations with an institution if it is necessary in order to become eligible for appointment as a medical reservist. The branches of the Surgeon-general's office hitherto occupying the Mills Building, a garage on M st., an apartment house on 18th st., and other places about town, were moved on Saturday and Monday into more commodious and conveniently situated quarters in the temporary structure at 7th and B sts.—*Army and Navy Register.*

Army Dental Corps.

Under a recent decision of the War department the dental corps of the regular army is entitled to about 300 officers, or about 90 more than it now has. Recently some 200 candidates for the appointment to this corps were examined, but the marking of the papers has not been completed. It is expected that a sufficient number will be found qualified to fill the vacancies. The National Defense Act of June 3, 1916, fixed the strength of the dental corps on the basis of 1 for every 1000 of enlisted men of the line of the army. This was amended by the act of October 6, 1917, which provides that there shall be 1 dental officer for every 1000 of the total strength of the regular army (commissioned and enlisted, line and staff) authorized from time to time by law, and that the dental corps shall consist of commissioned officers of the same grade and proportionally distributed among such grades as are now or may hereafter be provided by law for the medical corps.—*Army and Navy Register.*

Army Dental Surgeons.

Following is a list of candidates who have qualified in the recent examination for appointment to commissions in the regular army dental corps. Recommendations will be made today [May 4th] for the commissioning of these officers as first lieutenants. There remain seventy-five vacancies in the corps after these appointments are made:

(1) John Rudolph Wikeen. (2) Richard Carlton Hoblitzell. (3) Carl Eaton Safford. (4) Charles Jefferson Denholm. (5) Harry Holmes. (6) Elmer H. Niclies. (7) Harold Jensen. (8) William Edward Blurock. (9) Daniel Sumner Lockwood. (10) Thomas Winton Deyton. (11) James Barto Mann.

(12) Avery Scott Hills. (13) George Mason Babbitt. (14) Judge William Fowler. (15) Francis Stone Adams. (16) Archie T. McGuinness. (17) Carl Howard West. (18) Edwin M. Kennedy. (19) Merle W. Catterlin. (20) Thomas Minyard Page. (21) Clarence Pefferce Jackson. (22) Chester Bumgardner Parkinson. (23) Herbert Edwin Guthrie. (24) James Harold Keith.

The English Ivory Cross Fund.

On Saturday, February 2d, at the Bristol University, a meeting of dentists of Bristol, Eng., and district was held under the presidency of Major Ackland to hear addresses on the work of the Ivory Cross National Dental Aid Fund for Soldiers and Sailors, with the view of enlisting the sympathy and practical support of the dentists in the work. Miss Fletcher, the hon. secretary, explained that the origin of the Fund was the desire to do something in the important direction of dentistry among men in the navy and army by supplying artificial teeth as well as giving dental attention. The extensive nature of the work was indicated by the fact that over 15,000 applications had been dealt with; surgical treatment had been provided for over 11,000, and sets of artificial teeth had been provided for 2000. The work was still growing, and to meet the demands further funds were needed, as well as the practical support of the dentists of the country. Only registered dentists were allowed to do the work, and a reduced schedule of fees was arranged, for the period of the war only. Already 1200 members of the profession were assisting in the work, but more were required to cope with it. Those who were entitled to the benefits of the Fund were discharged service men, home army men, the mercantile marine, and necessitous poor, including mothers and children. As to the last-named, very little had been done, for lack of funds.—*Brit. Dental Journal.*

Navy Dental Corps.

The Navy department has decided that the act of August 29, 1916, does not, of its own vigor, vest in an acting assistant dental surgeon, appointed under the act of August 22, 1912, the office of dental surgeon (permanent) with the right of advancement to the rank of lieutenant after five years' service (including service as an acting assistant dental surgeon). The power of appointment was left where it would have been without the specific provision made in this case, namely, in the President.—*Army and Navy Register.*

"Ulcerative Stomatitis Associated with Vincent's Organisms."

Within the last few months I have had occasion to treat and thereby observe a condition of ulcerative stomatitis or gingivitis associated with spirochætæ and fusiform bacilli.

The constant finding of these organisms upon microscopical examination of the material from diseased mouths, and the absence of them in normal healthy mouths, has led me to believe that this condition has its etiology in these bacteria, and that it is not unlike the Vincent's angina of the tonsils and pharynx. In fact, in one case the infection started about the gingival tissue in the right superior and inferior molar regions, and three days later had spread to the tonsils and pharynx.

It seems to be a disease particularly prevalent and confined to our new troops training in France. As yet I am at a loss as to what to attribute it to, but to my mind it is not altogether impossible to believe that the oral neglect which is apt to follow camp life, and the close contact which actually exists between the men, may, in part at least, predispose to and promote this affection.

TREATMENT.

The cause or causes must be removed if permanent results are to be expected. This process usually consists of placing the mouth in a hygienic condition by first removing all of the deposits present. The patient should be impressed with the importance of absolute cleanliness, and the necessity of brushing the teeth at least three times a day, especially the last thing at night, regardless of the soreness of the gums. The sloughs should be picked off everywhere, and the raw, bleeding surfaces dried and touched up with 0.05 per cent. chromic acid or 95 per cent. phenol.

As potassium chlorate is of value in these cases, a wash should be prescribed. The following is one that is useful, and which I frequently advise:

℞—Potassii chloratis,	ʒjss
Tincturæ myrrhæ,	ʒij
Alcoholis,	ʒjss
Aquæ cinnamomi,	q. s. ad f℥vj

Sig.—Use as a mouthwash three times a day, and if too strong, dilute.

Potassium chlorate (full strength) should be given in tablet form, and occasionally one should be dissolved slowly on the tongue. A cathartic should be prescribed and the bowels kept open.

Carious teeth must be filled, and after the infection is controlled, all old, broken-down

roots should be removed. All irritating factors should be eliminated, smoking and drinking reduced, and any venereal disease must be properly treated.

Strict observance of the above treatment, with co-operation between patient and dentist, will bring about prompt and satisfactory results in a surprisingly short period.—LT. WM. H. GULLIFER, D.R.C., Amer. Exp. Force, France.

—*Journ. Allied Dental Societies.*

Promotions.

Dental Reserve Corps.

[*Note.*—In our May issue we announced among the promotions in the Dental Reserve corps that of WM. C. SPEAKMAN to Captain. We have since been informed that Dr. Speakman was promoted to Major.—ED.]

THE following appointments (promotions) are announced (April 20th):

To be MAJORS: 1st Lieuts. James P. Harper and William A. Heckard.

To be CAPTAINS: 1st Lieuts. Wm. McDougall, James H. Reid, Henry D. Rand, Ormsby Keselring, Paul S. Harner, Lloyd W. Bentley, Frank A. Clear, Weston B. Estes, Edward B. Lodge, Crittenden Van Wyck, Charles A. Couplin, Joseph P. Collins, Franklin M. Huson, David A. Proctor, Fred C. Sizelan, Charles Steffens, Douglas D. Goodwin, William A. Spence, Lee F. Strickler, James A. Johnson, Carl A. Anderson, Herman E. Tipton, Chester M. Meares, Earl J. Hill, Milfred I. Merritt, Thomas F. Montgomery, Harry F. Gravelle, Earle N. Hoopman, and Joshua H. Gaskill.

Announced April 27th:

To be CAPTAINS: 1st Lieuts. Guy W. Angelo, Edward R. Danforth, Charles J. Denholm, James B. Harrington, Frank E. Hendrickson, Miguel W. Jackson, James B. Jones, George R. Lee, Ralph D. Linn, Elbert W. King, Frank B. McAdams, Earl N. McCue, and Forest DeW. Suggs.

Announced May 4th:

To be MAJOR: 1st Lieut. Otis H. McDonald.

To be CAPTAINS: 1st Lieuts. Clarence J. Appleget, Albert J. T. Beatty, John E. Frates, Walton J. Graft, John W. Leggett, William B. Ley, Claude E. Markey, Wegor E. Mathison, Robert W. Meeker, Clinton T. Messner, Henley E. Miller, William L. Nance, Gilbert L. Walker, Raymond L. Anglemire, John T. Ashton, George F. Brand, Thew J. Ice, Clarence P. Jackson, Justin E. Nyce, Harry W. Porter, Floyd D. Soverel.

Announced May 11th:

To be MAJORS: Capt. Leonard G. Mitchell and 1st Lieut. Clement V. Vignes.

To be CAPTAINS: 1st Lieuts. Herman J. Brachman, James A. Campbell, Gordon B. Logan, Daniel F. McCarthy, Harold J. McGinn, Leon Reisner, Arthur C. Roblin, Wm. R. Snyder, Norman C. Spencer, Harold A. Stone, Harry M. Trafford, Harold Van Blarcom, Carl G. Anderson, Roy L. Bodine, Frank W. Boville, Merle W. Catterlin, Hubert F. Christiansen, Frank L. Cooper, Fred W. Dains, Samuel H. Davis, Pearley M. Fugler, George L. Gallagher, Grant C. Gentry, George R. Heap, Charles S. Irwin, Francis M. Kane, Chester K. Little, Otho L. McKay, Thomas G. McMartin, Seymour S. Skiff, Wm. J. Stark, Charles R. Wagner, and Raymond H. Williams.

Assignments.

Army Dental Corps.

Week ending April 20th.

Maj. Gerald D. Byrne from duty at Letterman General Hospital, San Francisco, to Fort Riley, Camp Funston, for duty.

The following to Fort Oglethorpe, medical officers' training camp, for course of instruction and return to stations: Majors Earp T. Dickmann, Wilfurth Hellman, Samuel Kaufman, Charles C. Mann, Lee B. Schrader, Walter S. Smith, and George R. Tressel. 1st Lieuts. Alvin E. Anthony, Wm. J. R. Akeroyd, Leslie D. Baskin, Clinton R. Boone, Joseph L. Boyd, Wm. B. Caldwell, Dell S. Gray, Curtis W. Hallam, Timothy Harden, Leslie S. Harlan, Winfred E. Henshaw, Claude R. Hollister, Glover Johns, Roy M. Kisner, Timothy F. Leary, Milton A. Price, Joseph L. Ralm, Samuel J. Rohde, Walter A. Rose, Wm. H. Siefert, Alexander M. Smith, Jr., Boyd L. Smith, Edward A. Thorne, Wm. T. Williams, Clarence J. Wright, and Cecil R. Hays.

Week ending May 4th.

1st Lieut. William A. Moore to Fort Crockett, Tex., for duty in coast defenses of Galveston.

Week ending May 11th.

Leave for two months on surgeon's certificate granted Lieut.-col. George I. Gunckel.

1st Lieut. Wm. A. Moore to Fort Screven for duty.

Dental Reserve Corps.

Week ending April 20th.

Capt. Wm. E. Beard to Fort Leavenworth for duty.

Capt. Claude L. Hunsicker to base hospital, Fort Des Moines, for duty.

Week ending May 11th.

Capt. Walter F. Clayton at Camp Sevier, S. C., report for duty in base hospital.

Preparedness League of American Dentists.

ORGANIZED UNDER THE AUSPICES OF THE N. D. A.

THE DENTAL COMMITTEE OF THE GENERAL MEDICAL BOARD, WHICH IS THE AGENCY FOR THE MEDICAL AND DENTAL PREPAREDNESS IN THIS WAR EMERGENCY, HAS MADE IT POSSIBLE FOR EVERY DENTIST IN THE UNITED STATES TO ASSIST IN THE WORK, UNDER THE SUPERVISION OF LIEUT. WM. A. HECKARD, D.R.C., U.S.A., STATIONED AT 50 EAST 42D ST., NEW YORK, N. Y.

REPORT FROM THE PRESIDENT.

Who should receive the services of the members of the League? Every worthy man within the draft age, whether he may or may not be in the service of his country at the time.

Let us forget all but the one thought—that we must do our utmost to help strengthen our great National Army. We must help make fighters to protect our flag, and we must do it *now;* tomorrow may be too late.

One of our members recently arose at 3 A.M. and worked until 5 that one of "our boys" might go away in comfort. It is noble work, and thousands of instances similar to this one might be related. The pride we feel in the way our profession is meeting the crisis cannot be expressed in mere words.

Every man you make dentally fit will fight for you in France. Have an army of your own.

ALL LEAGUE SERVICE MUST BE FREE.

It is well, perhaps, at this time to remind our members that all dental service rendered in the name of the League must be free. There can be no deviation from this rule without nullifying the great principle upon which our organization is founded. We are rendering an inestimable service to our country, and when we shall have completed our work, let it be said that we gave freely, gladly, and with true patriotic spirit.

THIRD ANNUAL MEETING OF THE LEAGUE.

Our third annual meeting will be held on August 7th, in conjunction with the National Dental Association, Chicago, Ill. We are arranging a program which will be of absorbing interest, and urge every member who belongs to the N. D. A. to join us in the enjoyment of the good things we are preparing.

J. W. BEACH, *President.*

REPORT FROM THE DIRECTOR-GENERAL.

Regarding the editorial from a western newspaper in which the "Questionnaire" asking dentists to join the League was criticized, inclosed with the letters you sent me to read, I would say that it looks very much like German propaganda, although I presume it was printed in all innocence, but if the editor had stopped awhile to consider it, undoubtedly he would have adopted another form of criticism.

The Preparedness League is working under the supervision of the Surgeon-general's office. That being the case, one must realize that before this questionnaire was made up, very serious consideration was given the form of the questions, and each question was devised for a specific purpose. The general purpose of all questions is to help us in securing new members for the Preparedness League, in order that the work may be increased to such an extent that the League may be of more efficient help to the Government.

THE QUESTION OF CHARGING FOR SERVICE.

Regarding the matter of paying for dental service by those who are well able to pay: A dentist is asked to give but one hour a day to the registrants; he would therefore be giving but one hour of free dental service whether the man could pay or not, and this surely is not a great hardship on anyone. If the registrant pays for the service, then it immediately ceases to be voluntary service on the part of the dentist, and is therefore not Preparedness League work. There is no objection to a man who is able to pay for the work going to his own dentist to have the work done and paying for it, but such service should not be recorded as free dental service or as Preparedness League work, as it is

work done strictly in a private capacity, and is in no way connected with volunteer service. On the other hand, if any registrant, however well able to pay, is willing to accept free service at the hands of the Preparedness League, it seems very little for the League to take care of him in comparison with the man's offering his life for our protection, and I should dislike very much to hear that any dentist would refuse volunteer service under these circumstances.

CONTINUOUS APPOINTMENTS NOT PRACTICABLE.

Making appointments with individual members of the drafted men is, I think, not practicable, for the reason that it is only through organized channels that the dentists offering their services can be assigned their fair proportion of the work. If work were continued on each mouth until it was put in good condition, it would work out to the advantage of the few and the disadvantage of the many. If a registrant needs a second or third appointment to make his mouth dentally fit, refer him back to the League's headquarters for such appointments, and if time permits there is no doubt that he will be taken care of; meanwhile, those who come after him are not being neglected.

On the other hand, if a registrant requires a second or third appointment and the dental operator is interested enough in his case to finish the work, then additional appointments may be made with the registrant, providing they do not interfere with the time he has already pledged the League. In other words, only one hour is to be given each registrant unless other provision has been made for him either by the dental operator or by the Preparedness League. The *once over* for each registrant is the important thing to be borne in mind.

BROKEN APPOINTMENTS.

When appointments, either first or second, are not kept, the result of course is loss of time. When this happens it is unfortunate and must be considered a part of our personal sacrifice, as there seems to be no way to guard against it. New appointments should not be given those who break their first appointments, but they should be referred back to the League's Headquarters and sent back to the state director.

CHAS. F. ASH, *Director-general.*

FORM 3-C CARDS.

EACH dentist should chart the operations performed, sign his name, and apply the stickers furnished by each state director or county director. If the operator has no sticker, cross out the name of the selective on the address side and write Lieut. W. A. Heckard, D.R.C., 50 East 42d st., New York City, across the card, and mail at once.

FORM 18 CARD.

When the work on each registrant is finished it should be recorded on form 18 card, and when this form 18 card is filled up and duly signed it should be dropped in the box and sent back to the state director. Each card takes care of itself, and records work done to date.

R. OTTOLENGUI,
Director of Publicity.

SPECIAL NOTICE.

Forsyth Dental Infirmary for Children.

PERMANENT STAFF APPOINTMENTS.

A competitive examination of graduates in dentistry (of less than three years' standing) for appointments to positions on the permanent staff for full and one-half time service will be held early in June at the Infirmary.

Appointments will be made for one or two years as follows: Full-time service, requiring operating five and one-half days a week at a salary of $1000 a year. Half-time service, requiring operating six half-days a week, either forenoon or afternoon, at a salary of $400 a year.

These appointments will be made subject to satisfying the requirements of the Massachusetts State Board of Registration in Dentistry, and to qualifying in the practical work of the clinics during one month's trial.

Members of this staff will be entitled to the advantages of reports and clinics by experts in the various branches of dentistry from different parts of the world, in addition to the numerous regular clinics and lectures. Operators after serving four months are eligible, by qualifying, for appointments in the special

clinics where postgraduate work is given. The operators on this staff have the advantage of the clinics and lectures of the Postgraduate School of Orthodontia.

The Infirmary clinics provide unusual advantages in the various departments of the institution where operative dentistry, orthodontia, nose and throat and oral surgery, extracting, novocain technique, radiography, pathological diagnosis, and research work are continually carried on. The average number of cases treated daily is more than 450 in all departments. All material and necessary operating instruments will be furnished. Up-to-date apparatus, including electric engines, sterile instrument trays, fountain cuspidors, compressed air, and the modern operating-room type of laboratories, are available for use.

A diploma for service will be issued by the trustees to each member of this staff who has completed his term of service in a satisfactory manner.

Applications for the above positions should be made at once.

Information and the date of the examination will be furnished to those interested.

HAROLD DEW. CROSS, *Director*,
140 The Fenway, Boston, Mass.

SOCIETY NOTES AND ANNOUNCEMENTS

Coming Dental Society Meetings.

National.

NATIONAL DENTAL ASSOCIATION. Chicago. August 5th to 9th.

NATIONAL ASSOCIATION OF DENTAL FACULTIES. Chicago. August 2d and 3d.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS. Chicago. August 5th and 6th.

AMERICAN SOCIETY OF ORTHODONTISTS. Chicago. August 1st to 3d.

ASSOCIATION OF MILITARY DENTAL SURGEONS. Chicago.

DELTA SIGMA DELTA FRATERNITY. Chicago. August 5th.

PSI OMEGA FRATERNITY—NATIONAL ALUMNI CHAPTER. Chicago. August 5th.

XI-PSI PHI FRATERNITY. Chicago.

State Meetings.

JUNE.

AMERICAN MEDICAL ASSOCIATION—SECTION ON STOMATOLOGY. Chicago. June 11th to 14th.

COLORADO STATE DENTAL SOCIETY. Estes Park. June 20th to 22d.

FLORIDA STATE DENTAL SOCIETY. Atlantic Beach. June 20th to 22d.

"FOUR STATES" POSTGRADUATE MEETING [ALABAMA, MISSISSIPPI, TEXAS, AND LOUISIANA]. New Orleans. June 3d to 6th.

GEORGIA STATE DENTAL SOCIETY. Atlanta. June 12th to 14th.

KENTUCKY STATE DENTAL ASSOCIATION. Lexington. June 13th to 15th.

MAINE DENTAL SOCIETY. Portland. June 26th to 28th.

MARYLAND STATE DENTAL ASSOCIATION. Baltimore. June 6th to 8th.

NEW YORK STATE DENTAL SOCIETY. Saratoga Springs. June 13th to 15th.

NORTH CAROLINA DENTAL SOCIETY. Wilmington. June 19th to 21st.

NORTHEASTERN MASSACHUSETTS DENTAL SOCIETY. Swampscott. June 26th and 27th.

NORTHERN OHIO DENTAL ASSOCIATION. Toledo. June 6th to 8th.

SOUTH CAROLINA STATE DENTAL ASSOCIATION. Columbia. June 27th to 29th.

TENNESSEE STATE DENTAL ASSOCIATION. Nashville. June 17th to 19th.

UTAH STATE DENTAL SOCIETY. Salt Lake City. June 19th to 22d.

WASHINGTON STATE DENTAL SOCIETY. Spokane. June 27th to 29th.

WYOMING STATE DENTAL SOCIETY. Thermopolis. June 10th.

JULY.

CALIFORNIA STATE DENTAL ASSOCIATION. San Francisco. July 8th to 13th.

INTERSTATE DENTAL ASSOCIATION. (Col'd.) Buckroe Beach, Va. July 10th to 12th.

MONTANA STATE DENTAL SOCIETY. Butte. July 18th to 20th.

NEW JERSEY STATE DENTAL SOCIETY. Atlantic City. July 17th to 19th.

Examiners' Meetings.

ALABAMA BOARD OF EXAMINERS. Birmingham. June 17th.

CALIFORNIA BOARD OF EXAMINERS. Los Angeles. June 10th.

CONNECTICUT DENTAL COMMISSIONERS. Hartford. June 20th to 22d.

IDAHO BOARD OF EXAMINERS. Boise. June 10th to 13th.

INDIANA BOARD OF EXAMINERS. Indianapolis. June 17th to 22d.

IOWA BOARD OF EXAMINERS. Iowa City. June 3d.

MAINE BOARD OF EXAMINERS. Augusta. July 1st.

MASSACHUSETTS BOARD OF EXAMINERS. Boston. June 22d to 29th.

MICHIGAN BOARD OF EXAMINERS. Ann Arbor. June 17th to 22d.

MISSISSIPPI BOARD OF EXAMINERS. Jackson. June 18th.

MISSOURI DENTAL BOARD. St. Louis. June 7th and 8th. Jefferson City. June 10th to 12th.

MONTANA BOARD OF EXAMINERS. Helena. July 8th to 11th.

NEBRASKA BOARD OF EXAMINERS. Lincoln. June 17th to 21st.

NEW JERSEY BOARD OF REGISTRATION. Trenton. June 24th to 28th.

NORTH CAROLINA BOARD OF EXAMINERS. Wilmington. June 17th.

NORTH DAKOTA BOARD OF EXAMINERS. Fargo. July 9th.

OKLAHOMA BOARD OF EXAMINERS. Oklahoma City. June 10th.

PENNSYLVANIA BOARD OF EXAMINERS. Philadelphia and Pittsburgh. June 12th to 15th.

RHODE ISLAND BOARD OF REGISTRATION. Providence. June 18th to 20th.

SOUTH CAROLINA BOARD OF EXAMINERS. Columbia. June 24th.

SOUTH DAKOTA BOARD OF EXAMINERS. Sioux Falls. July 1st.

TENNESSEE BOARD OF EXAMINERS. Nashville. June 11th to 15th.

TEXAS BOARD OF EXAMINERS. San Antonio. June 17th.

VERMONT BOARD OF EXAMINERS. Montpelier. June 24th to 26th.

WASHINGTON BOARD OF EXAMINERS. Seattle. May 30th to June 5th.

WISCONSIN BOARD OF EXAMINERS. Milwaukee. June 17th.

American Medical Association.

Section on Stomatology.

Following is the program for the American Medical Association, Section on Stomatology, for the meeting to be held in Chicago, June 11 to 14, 1918:

Chairman's Address. Dr. Frederick B. Noyes, Chicago.

(1) "Chancre of the Lip Following Injury with Dentist's Emery Disk." Dr. Adelbert M. Moody, Chicago.

(2) "An Analysis of Two Hundred Cases of Malignant Diseases in the Oral Cavity by Electro-thermic Methods, or in Combination with Operative Surgery, X-rays, or Radium." Dr. Wm. L. Clark, Philadelphia, Pa.

(3) "Treatment of Epithelioma of the Jaws and Cheek with Heat and Radium." Dr. Gordon B. New, Rochester, Minn.

Discussion—Dr. Albert T. Ochsner, Chicago, Ill.

(4) "The Lipoids of Tumors of the Dental System." Dr. Kaethe W. Dewey, Chicago, Ill.

(5) "The Genesis of the Epithelial Débris in the Peridental Membrane, Nasmyth's Membrane, and the Granular Layer of Tomes." Dr. Eugene S. Talbot, Chicago, Ill.

(6) "Additional Roentgenographic Studies of Infections of the Maxillary Bones." Dr. Arthur D. Black, Chicago, Ill.

(7) "Microscopic Studies of Diseased Peridental Tissues, Illustrated by Stereopticon." Dr. Edward H. Hatton, Chicago, Ill.

(8) "Absorption of the Roots of Teeth." Dr. Herbert A. Potts, Chicago, Ill.

(9) "Neuralgia Dentalis." Dr. Kurt H. Thoma, Boston, Mass.

(10) "Longitudinal and Transverse Sectional Views of the Accessory Sinuses of the Human Cranium, Cut Parallel, and at Right Angles to the Nasal Septum." Dr. Geo. Edward Fell, Chicago, Ill.

(11) "Fractures of the Bones of the Face, with Complication." Dr. Vida Latham, Chicago, Ill.

(12) "Fractures and Dislocations of the Jaws." Dr. Chalmers J. Lyons, Ann Arbor, Mich.

(13) "A New Surgical Procedure for Operating in Cases of Suppurative Gingivitis with Alveolar Involvement." Dr. Arthur Zentler, New York City, N. Y.

The officers of the Section cordially invite those who are interested in the program to be present, and to take part in the discussions.

FREDERICK B. NOYES, *Chairman*,
EUGENE S. TALBOT, *Sec'y*.

National Dental Association.

TWENTY-SECOND ANNUAL MEETING,

Chicago, August 5th to 9th.

SPECIAL ANNOUNCEMENT OF HOTELS AND GARAGES.

THE National Dental Association will hold its Twenty-second Annual Meeting in Chicago, August 5–9, 1918. The headquarters will be at the Auditorium and Congress Hotels, situated on Michigan ave., cor. Congress st. All meetings, clinics, and exhibits will be held in these two hotels, which are connected by an underground tunnel.

The important announcement at this time must be the warning: RESERVE YOUR ROOMS AT ONCE. Make reservations by mail direct to the hotel of your choice. Arrangements for parking cars should be made direct to the garage.

Hotels.

Following are the rates of the two hotels:

Auditorium Hotel (Michigan Boulevard and Congress st.): Single room without bath, $1.50 and $2.00 per day. Single room with bath, $2.50 to $4.00 per day. Double room without bath, $2.50 and $3.00 per day. Double room with bath, $4.00, $5.00, and $6.00 per day.

Congress Hotel and Annex (Michigan ave. and Congress st.): Room, detached bath (one person), $2.00, $2.50, $3.00 per day. Room, private bath (one person), $3.00, $3.50, $4.00, $5.00, $6.00 per day. Room, detached bath (two persons), $3.00, $4.00, $5.00 per day. Room, private bath (two persons), $5.00, $6.00, $7.00 per day. Suites: Two connecting rooms, private bath (two persons), $6.00 to $10.00 per day. Three or four persons, $8.00 to $14.00 per day.

Corner suites: Parlor bedroom and private bath, $10.00 to $50.00 per day.

Garages.

The following is a list of garages and rates:

CITY AUTO PARKING COMPANY.
(A. V. Jackson, Gen. Mgr.,
Michigan ave. and Lake st., Chicago, Ill.)

Our rates for storage are $1.00 for the first 24 hours, and 75 cents each additional 24 hours. At these rates cars can be taken out for driving and reparked during the same 24-hour period at same charge.

DOWN TOWN GARAGE.
(A. J. Bemmer, Mgr.,
Michigan blvd. and Eighth st.)

"We are prepared to take care of thirty or forty cars during your convention, at a special rate of 75 cents per day, providing they notify us of their identity as members of your association."

One thousand cars can be parked in Grant Park (on the Lake Front) free. The city of Chicago furnishes policemen to watch these cars.

J. P. BUCKLEY,
Chairman Publicity Committee.

GENERAL CLINIC.

Arrangements are sufficiently advanced to promise the members of the Association that the General Clinic will be one of the great features of the 1918 meeting.

In conference with officers of the National Dental Association, the committee in charge of the General Clinic carefully considered the nature of the clinic to be presented this year. After trying for the past few years new features in conducting the clinic program, it is the belief that a greater number will be served and benefited by holding a General Clinic, grouped in sections: Operative, Prosthetic, Crown and Bridge Work, Orthodontia, and Prophylaxis.

To make it National in character, the presidents of the different state societies were requested each to appoint two clinicians and two associates from his state society.

Up to date, thirty-nine state societies are represented, and the remaining nine will be represented before the publishing of the ofcial program.

Far-away Alaska is sending two, and two associates, and to make the Clinic more than National—in fact, an "Allied" affair—the Canadian Dental Association has promised ten of the best clinicians in the Dominion. In addition, there will be a few unit clinicians who will demonstrate principles that require more than two men.

It is safe to say that this Clinic will be unique in the sense that every man on the program will either be present or be represented by his associate.

DON M. GALLIE,
Chairman General Clinic.

[AT CHICAGO.]

National Association of Dental Examiners.

THE next meeting of the National Association of Dental Examiners will be held in Chicago, Ill., August 5 and 6, 1918, at the Auditorium Hotel.

For further information address

J. A. WEST, *Sec'y,*
417 Utica Bldg., Des Moines, Iowa.

[At Chicago.]

National Association of Dental Faculties.

The next annual meeting of the National Association of Dental Faculties will be held in the Green Room of the Congress Hotel, Chicago, Ill., August 2, 1918, at noon. The Executive Committee will meet at 10 a.m. on the 2d. The meeting will continue through August 3d.

Chas. C. Allen, *Sec'y*,
N. W. cor. 10th and Troost, Kansas City, Mo.

[At Chicago.]

American Society of Orthodontists.

The eighteenth annual meeting of the American Society of Orthodontists will be held August 1, 2, and 3, 1918, at the Edgewater Beach Hotel, Chicago, Ill.

This will be an excellent meeting. It is advisable to make your reservations early.

F. M. Casto, *Sec'y*,
Rose Bldg., Cleveland, Ohio.

[At Chicago.]

Psi Omega Fraternity.

The National Alumni Chapter of the Psi Omega Fraternity has established headquarters during the National Dental Association meeting at Room 230, Auditorium Hotel.

The business session of the National Alumni Chapter will be held in the New Ballroom of the Auditorium Hotel, Monday, August 5th, at 2.00 p.m.

The Psi Omega banquet will be held in the Florentine Room of the Congress Hotel at 7.00 p.m., Monday, August 5th.

Psi Omegas who expect to attend the banquet should communicate at once with Dr. M. M. Printz, 4235 Lake Park ave., Chicago.

[At Chicago.]

Delta Sigma Delta Fraternity.

The thirty-fourth annual meeting of the Supreme Chapter of Delta Sigma Delta Fraternity will be held in the Florentine Room of the Congress Hotel, Chicago, on Monday, August 5, 1918, at 9 a.m.

Headquarters of the Fraternity will be at the same hotel, where the annual banquet will also be held in the evening, in the Gold Room. (Notify Dinner Committee *at once.*)

By order of the Supreme Chapter.

Hy. W. Morgan, *Supreme Gr. Master.*
R. Hamill D. Swing, *Supreme Scribe.*

Northern Ohio Dental Association.

The annual meeting of the Northern Ohio Dental Association will be held June 6, 7, and 8, 1918, at Toledo, Ohio.

C. H. Clark, *Sec'y*,
Youngstown, Ohio.

Georgia State Dental Society.

The semi-centennial meeting of the Georgia State Dental Society will be held in Atlanta, Ga., June 12, 13, and 14, 1918, when this society will celebrate its fiftieth anniversary.

North Carolina Dental Society.

The North Carolina Dental Society will meet on June 19 to 21, 1918. Headquarters, Oceanic Hotel, Wilmington, N. C.

W. T. Martin, *Sec'y.*

Utah State Dental Society.

The Utah State Dental Society will meet at the Hotel Utah, Salt Lake City, Utah, June 19th to 22d inclusive.

E. C. Fairweather, *Sec'y.*

Northeastern Massachusetts Dental Society.

The annual meeting of the Northeastern Massachusetts Dental Society will be held at the New Ocean House, Swampscott, Mass., Wednesday and Thursday, June 26th and 27th. Finest hotel on the North Shore. All ethical members of the profession are cordially invited. Hotel rates one-half: $5.00 per day. For program address

F. E. Jeffrey, *Sec'y*,
Salem, Mass.

Dental Society of the State of New York.

The fiftieth anniversary of the Dental Society of the State of New York will be held at Saratoga Springs, N. Y., June 13, 14, and 15, 1918, The society will endeavor to present a literary, clinic, and social program for the benefit of the profession, in keeping with its golden anniversary. A cordial invitation is extended to all members of the National Dental Association. For further information write

A. P. Burkhart, *Sec'y*,
52 Genesee st., Auburn, N. Y.

Maine Dental Society.

THE fifty-third anniversary meeting of the Maine Dental Society will be held in the City-hall, Portland, Me., June 26 to 28, 1918.

I. E. PENDLETON, *Sec'y*,
Lewiston, Me.

Washington State Dental Society.

THE Washington State Dental Society will hold its next meeting in Spokane, Wash., June 27, 28, and 29, 1918.

A. STARKE OLIVER, *President*,
FRANK B. LYNOTT, *Sec'y*,
249 Peyton Bldg., Spokane, Wash.

Tennessee State Dental Association.

THE fifty-first annual meeting of the Tennessee State Dental Association will be held in Nashville, Tenn., June 17, 18, and 19, 1918.

GEO. L. POWERS, *Sec'y*,
Paris, Tenn.

South Carolina State Dental Association.

THE annual meeting of the South Carolina State Dental Association will be held at the Jefferson Hotel, Columbia, S. C., June 27, 28, and 29, 1918.

W. BUSEY SIMMONS, *President*.
ERNEST C. DYE, *Sec'y*.

Kentucky State Dental Association.

THE next annual meeting of the Kentucky State Dental Association will be held at Lexington, Ky., June 13, 14, and 15, 1918. An "amalgam program" of special interest.

Address all correspondence to

W. M. RANDALL, *Sec'y*,
1035 Second st., Louisville, Ky.

Northwestern University Dental School.

THE Northwestern University Dental School Alumni Association will hold the annual Home-coming Clinic, 31 W. Lake st., Chicago, Ill., on June 10 and 11, 1918. Special features have been provided which will insure a successful and interesting meeting. Make your arrangements now.

M. M. PRINTZ, *Sec'y*,
4235 Lake Park ave., Chicago.

Postgraduate Dental Meeting:

Alabama—Mississippi—Texas—Louisiana.

(1) *Place of meeting.* New Orleans, at the Grunewald Hotel.

(2) *Date.* To avoid interfering with dental college exercises and dental examining board meetings, and to be assured of pleasant weather, the date June 3, 4, 5, and 6 has been selected.

(3) In order to give each member an equal opportunity to get all that is possible and not congest the meeting the membership will be limited to 350 members.

(4) Membership cards will be issued only to members in good standing in their state dental societies, and to dentists in the army and navy dental corps.

(5) The registration books will be closed May 27th (one week before the meeting) to all except members of the army and navy dental corps.

(6) *Fee.* Owing to increased cost of postage and stationery and all other expenses, the membership fee to the general meeting will be ten dollars. Special courses following the general meeting, fifteen dollars for each course.

(7) No one will be issued a special course card unless he has registered for the general meeting.

The subjects to be taught at the next meeting will be as follows:

"Nerve Blocking." Dr. Arthur E. Smith, Chicago.

"Technique of Root-canal Preparation, Treatment and Filling." Dr. Elmer S. Best, Minneapolis.

"Full Upper and Lower Dentures." Dr. Rupert E. Hall, Chicago.

"Exodontia." (Instructor to be selected.)

General Chairman—J. J. Sarrazin, 424 Godchaux Bldg., New Orleans, chairman Committee on Interstate Relations.

General Secretary—Leo C. Dempsey, 943 Jackson ave., New Orleans.

Ask yourself the question, Can I afford to miss this meeting? Send your application for membership to the Four States Postgraduate meeting, with your check for ten dollars, to your state chairman for indorsement and transmission by him to Dr. L. C. Dempsey, the general secretary. Members of the Louisiana State Dental Society can apply direct to Dr. Dempsey with membership fee inclosed.

J. P. WAHL, *Ch'man Publicity Com.*,
1135 Maison Blanche, New Orleans, La.

Florida State Dental Society.

THE Florida State Dental Society will hold its next annual meeting at the Atlantic Beach Hotel, Atlantic Beach, Fla., on June 20, 21, and 22, 1918, where fishing, golfing, and surf bathing is unsurpassed.

A fine program is being planned. All ethical practitioners of this and other states invited.

For further particulars address

D. D. CREWS, *Sec'y*,
Fort Myers, Fla.

California State Dental Association.

THE California State Dental Association will hold its regular annual session for the year 1918 in San Francisco, July 8 to 13, 1918.

We will conduct our meeting this year on the Oklahoma plan, and feel that we can assure all who attend a pleasant as well as a profitable meeting. Further information may be obtained by addressing

JOHN E. GURLEY, *Sec'y*,
350 Post st., San Francisco.

New Jersey State Dental Society.

THE forty-eighth annual convention of the New Jersey State Dental Society will be held on July 17, 18, and 19, 1918, on Young's Million Dollar Pier, Atlantic City, N. J.

The entire convention will be held on the pier. Machinery Hall will be used for the exhibits. Those who attended last year will remember the magnificent display of dental goods, and Dr. S. I. Callahan of Woodstown, N. J., chairman of the Exhibit Committee, with 25,000 square feet of space, has promised an exhibit greater than that of 1917.

The Essay Committee, under the direction of Dr. C. M. F. Egel of Westfield, will present two or three essayists of prominence—names and subjects to be announced.

All meetings for the presentation of papers as well as the business meetings will be held in the Greek Temple, out on the pier.

The headquarters of the society will be at the pier entrance. Mail may be directed to exhibitors, clinicians, or members in care of the Secretary New Jersey State Dental Society, Young's Million Dollar Pier.

A cordial invitation is extended to ethical practitioners.

JOHN C. FORSYTH, *Sec'y*,
430 E. State st., Trenton, N. J.

American Institute of Dental Teachers.

AT the last annual meeting of the American Institute of Dental Teachers, held at Pittsburgh, Pa., January 29 to 31, 1918, the following officers were elected: Dr. A. W. Thornton, McGill University, Department of Dentistry, Montreal, Que., president; Dr. R. W. Bunting, Ann Arbor, Mich., vice-president; Dr. Abram Hoffman, 381 Linwood ave., Buffalo, N. Y., secretary-treasurer. Executive Board—A. D. Black, Chicago, Ill., G. S. Millberry, San Francisco, Cal., and A. H. Hipple, Omaha, Nebr.

The next annual meeting will be held January 28, 29, and 30, 1919, the place of meeting to be announced later.

Indiana Board of Examiners.

THE next meeting of the Indiana State Board of Dental Examiners will be held at the State-house, Indianapolis, June 17th to 22d inclusive. Applications and other information may be obtained by addressing

H. C. MCKITTRICK, *Sec'y*,
Indianapolis, Ind.

South Carolina Board of Examiners.

THE annual meeting of the South Carolina Board of Dental Examiners will be held at The Jefferson, Columbia, S. C., beginning promptly at 9 o'clock, Monday morning, June 24, 1918.

All applications must be in the hands of the secretary by June 14th. Application blanks and full information may be obtained by addressing

R. L. SPENCER, *Sec'y*,
Bennettsville, S. C.

Mississippi Board of Examiners.

THE Mississippi Board of Dental Examiners will hold its next annual meeting at the State Capitol building in Jackson, on the third Tuesday in June 1918, at 8 A.M. Fee for examination $10. Diploma from recognized school and certificate of moral character required. No reciprocity or interchange. For further information address

B. J. MARSHALL, *Sec'y*,
Marks, Miss.

Connecticut Dental Commission.

THE Dental Commissioners of Connecticut will meet at Hartford, June 20, 21, and 22, 1918, to examine applicants for license to practice dentistry, to examine applicants for dental hygienist's license, and to transact any other business proper to come before them. For blanks and further information, address

EDWARD EBERLE, *Recorder*,
902 Main st., Hartford, Conn.

Washington Board of Examiners.

THE Washington State Board of Dental Examiners will hold their next meeting at Seattle, Wash., May 30 to June 5, 1918. Address all communications to

FRANK B. LYNOTT, *Sec'y*,
249 Peyton Bldg., Spokane, Wash.

Michigan Board of Examiners.

THE next meeting of the Michigan State Board of Dental Examiners will be held at the Dental College, University of Michigan, Ann Arbor, Michigan, June 17th to 22d inclusive. Applications and other information may be obtained by addressing

B. S. SUTHERLAND, *Sec'y*,
Owosso, Mich.

North Carolina Board of Examiners.

THE next meeting of the North Carolina State Board of Dental Examiners will be held at Wrightsville Beach, Wilmington, N. C., beginning promptly at 9 o'clock on Monday morning, June 17, 1918. For further information and application blanks address

F. L. HUNT, *Sec'y*,
Asheville, N. C.

Rhode Island Board of Registration.

A MEETING of the Rhode Island Board of Registration in Dentistry for the examination of candidates will be held in the State-house, Providence, R. I., June 18, 19, and 20, 1918. Applications, accompanied with the proper fee, should be in the hands of the secretary by June 11th.

For further information address

ERNEST A. CHARBONNEL, *Sec'y*,
139 Mathewson st., Providence, R. I.

Massachusetts Board of Examiners.

A MEETING of the Massachusetts Board of Dental Examiners will be held in Boston, Mass., June 22 to June 29, inclusive, 1918, for the examination of candidates for registration. All applications must be in the hands of the secretary on or before June 13th. For further information address

GEORGE H. PAYNE, *Sec'y*,
29 Commonwealth ave., Boston, Mass.

Missouri Dental Board.

THE Missouri Dental Board will hold its next regular meeting for examining applicants who desire to register in Missouri, at Jefferson City, Monday, Tuesday, and Wednesday, June 10, 11, 12, 1918.

Applications and fees must be in the hands of the secretary prior to beginning the examination. The practical examination (given at the colleges in Kansas City on Monday and Tuesday, May 13th and 14th) will be given at the St. Louis colleges on Friday and Saturday, June 7th and 8th. It will be more convenient for those taking the examination to take the practical work at colleges if they can so arrange it.

V. R. MCCUE, *Sec'y*,
Cameron, Mo.

Pennnsylvania Board of Examiners.

THE next examination of the Pennsylvania Board of Dental Examiners will be held in Philadelphia and Pittsburgh on Wednesday, Thursday, Friday, and Saturday, June 12, 13, 14, and 15, 1918.

The examination in practical work will be in the Evans Dental Institute, 40th and Spruce sts., Philadelphia, and at the University of Pittsburgh, Pittsburgh, on Wednesday, June 12th. The examination in operative work will be held at 8.30 A.M. in each city and the prosthetic work at 1.30 P.M. Applicants are required to furnish all instruments and a patient for the operative work.

The theoretical examination will be held in Musical Fund Hall, Philadelphia, and College of Pharmacy, Pride and Bluff sts., Pittsburgh, beginning at 9 A.M. on Thursday, June 13th.

Application papers can be secured from the department of Public Instruction, Harrisburg.

ALEXANDER H. REYNOLDS, *Sec'y*,
4630 Chester ave., Philadelphia.

Wisconsin Board of Examiners.

THE Wisconsin State Board of Dental Examiners will hold their spring examination, June 17, 1918, at the Marquette College, Ninth and Wells sts., Milwaukee, Wis. All applications must be in the secretary's hands thirty days before examination.

F. A. TATE, *Sec'y*,
Rice Lake, Wis.

Oklahoma Board of Examiners.

THE Oklahoma Board of Dental Examiners will meet in regular semi-annual session at Oklahoma City, Okla., beginning Monday, June 10, 1918. For further information write

H. OVERBEY, *Sec'y*,
Ryan, Okla.

Tennessee Board of Examiners.

THE Tennessee State Board of Dental Examiners will hold their next meeting June 11th to 15th, inclusive, at the Hermitage Hotel, Nashville, Tenn.

W. G. HUTCHISON, *Sec'y*,
Nashville, Tenn.

Texas Board of Examiners.

THE next regular examination of the Texas State Board of Dental Examiners will be held in San Antonio, Texas, beginning June 17, 1918, at 9 A.M. No diplomas exchanged; no reciprocity.

The application fee of $25 should be in the hands of the secretary not later than June 12th. For further particulars and application blanks address

HARRISON B. CAVE, *Sec'y*,
810-14 Wilson Bldg., Dallas, Texas.

Alabama Board of Examiners.

THE Board of Dental Examiners of Alabama will conduct an examination of applicants for license to practice dentistry in Alabama at the Birmingham Dental College, in Birmingham, beginning at ten o'clock Monday morning, June 17, 1918. All applications, accompanied by necessary fee, with proper credentials, should be in the hands of the secretary-treasurer at least one week before the examinations begin.

For further information, application blanks, etc., address

H. CLAY HASSELL, *Sec'y-Treasurer*,
Tuscaloosa, Ala.

Nebraska Board of Examiners.

THE next regular meeting of the Nebraska State Board of Dental Examiners will be held June 17, 18, 19, 20, and 21, 1918, at Lincoln, Nebr.

S. A. ALLEN, *Sec'y*.

Idaho Board of Examiners.

THE Idaho State Board of Dental Examiners will hold their next session at Boise, Idaho, June 10, 11, 12, and 13, 1918.

A. M. JACOBSEN, *Sec'y*,
Pocatello, Idaho.

Iowa Board of Examiners.

THE next meeting of the Iowa State Board of Examiners will be held at Iowa City, Iowa, commencing June 3, 1918, at 9 A.M.

For further information address

J. A. WEST, *Sec'y*,
417 Utica Bldg., Des Moines, Iowa.

New Jersey Board of Registration.

THE State Board of Registration and Examination in Dentistry of New Jersey will hold their annual meeting and examination in the Assembly chamber, at the State-house, Trenton, N. J., on June 24, 25, 26, 27, and 28, 1918. License fee $25, re-examination $10.

Applications must be filed complete ten days before the date of the examinations. Address all communications for further particulars to

JOHN C. FORSYTH, *Sec'y*,
430 E. State st., Trenton, N. J.

Vermont Board of Examiners.

THE next meeting of the Vermont Board of Dental Examiners for the examination of candidates to practice in Vermont will be held at the State-house, Montpelier, commencing at 2 P.M., on June 24, 1918, and continuing for three days.

To be eligible for examinations a candidate must be (1) twenty-one years of age, (2) a graduate of a high school of the first class, and (3) of a reputable dental college.

Applications must be in the hands of the secretary not later than June 15th. For further information apply to

HARRY F. HAMILTON, *Sec'y*,
Newport, Vt.

Montana Board of Examiners.

The Montana State Board of Dental Examiners will hold a session for examination July 8, 9, 10, and 11, 1918, at Helena, Mont. Applications should be in the hands of the secretary fifteen days before the meeting.

G. A. Chevigny, *Sec'y*,
107 Yegen Bank Bldg., Butte, Mont.

South Dakota Board of Examiners.

The next meeting of the South Dakota State Board of Dental Examiners will be held at Sioux Falls, S. D., beginning promptly at 9 o'clock, Monday morning, July 1, 1918.

All applications must be in the hands of the secretary by June 24th. Fee for examination $25. No reciprocity or interchange. Full information and application blanks may be received by addressing

L. S. Spencer, *Sec'y*,
Watertown, S. D.

North Dakota Board of Examiners.

The next meeting of the North Dakota State Board of Dental Examiners will be held at Fargo, July 9, 1918. All applications and credentials must be in the hands of the secretary July 1st. For application blanks or further information address

W. E. Hocking, *Sec'y*,
Devils Lake, N. D.

Maine Board of Examiners.

The Maine Board of Dental Examiners will hold their regular examination, beginning July 1, 1918, at 8.30 a.m., at the State-house.

All applications and fee, $20, must be in the hands of the secretary by June 21, 1918.

The examination for Dental Hygienists will be given at the same time; fee $10.

Will S. Payson, *Sec'y*,
Castine, Maine.

United States Patents

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING APRIL 1918.

April 2.

No. 1,261,339, to Edward H. Angle. Orthodontic appliance.

No. 1,261,585, to Wm. L. Mayo. Combination toothbrush and powder-box.

No. 1,261,737, to Hugh D. Morgan. Means for attaching an artificial tooth to a backing or bridge plate.

No. 121,030, to Jennie Agan. Trade-mark for face creams, face powder, tooth-powder, tooth-paste, tooth-washes, hair tonic, foot-powder, and all cosmetics.

No. 121,040, to Albert E. Brown. Trade-mark for antiseptic mouth-wash.

April 9.

No. 1,262,184, to John Michael Donahoe. Means for retaining lower partial dentures in the mouth.

No. 1,262,464, to Chas. Dierke. Dental floss holder.

No. 1,262,465, to Frederick C. Dohrmann. Antiseptic toothbrush holder.

No. 1,262,520, to John A. Keller. Toothbrush holder.

April 16.

No. 1,262,629, to Georges A. Brouillet. Process of filling teeth.

No. 1,262,705, to Wm. F. Shaw. Anchor attachment for removable bridge work.

No. 1,263,234, to Oscar J. Hanson. Dentist's lamp.

No. 1,263,311, to Wm. J. Curry. Artificial tooth-fastening.

No. 1,263,313, to Jas. S. Donnellan. Attaching means for artificial sets of teeth.

No. 121,219, to Society of Chemical Industry in Basle. Trade-mark for certain pharmaceutical preparations to be used as antiphoretics, anesthetics, analgesics.

No. 121,231, to Williams Brush Co. Trade-mark for toothbrushes, nail-brushes, and hair-brushes.

April 23.

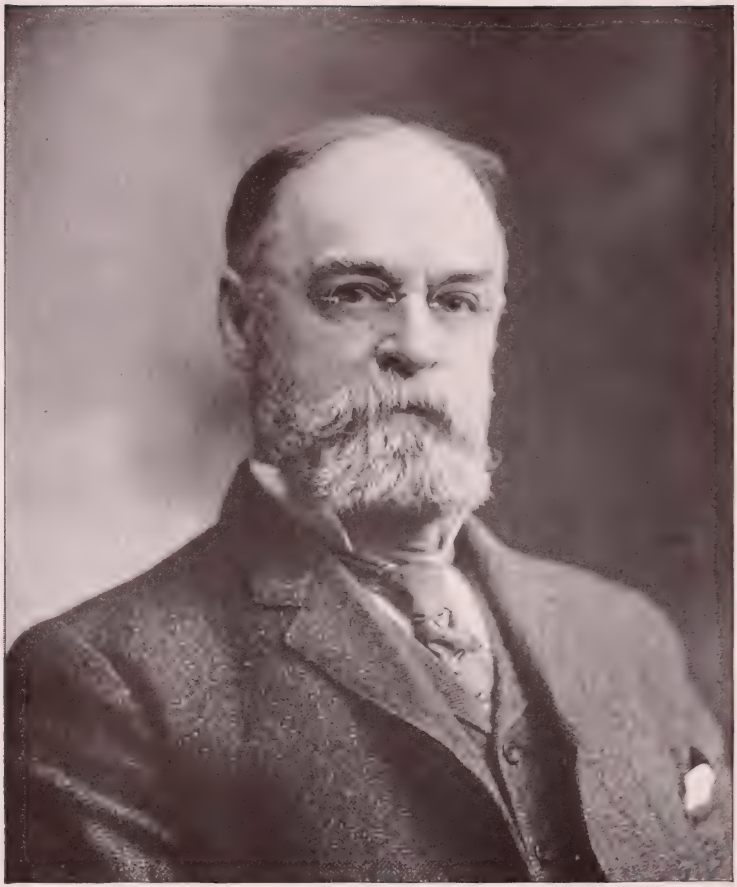
No. 1,263,752, to Isadore A. Eppstein. Tooth structure.

April 30.

No. 1,264,496, to Leo E. Evslin. Porcelain crown.

No. 1,264,615, to Hiram O. Cowdrick. Artificial tooth.

No. 121,386, to Henry Willard Allen. Trade-mark for tooth-paste, liquid tooth-wash and dental soap.



DR. ALVIN R. EATON.

THE

DENTAL COSMOS

VOL. LX. JULY 1918. No. 7

ORIGINAL COMMUNICATIONS

Cysts of the Dental System.

By KAETHE W. DEWEY, M.D., Chicago, Ill.

From the Research Laboratory of the College of Dentistry, Univ. Illinois.

HISTORICAL.

CYSTS of the dental system are generally classified as root-cysts, follicular cysts, and multilocular cysts, and by the majority of authorities are believed to arise from anomalies and from remnants of the enamel organ. Root-cysts and follicular cysts are more frequently found in the upper jaw, while multilocular cysts and their solid forerunners are with rare exceptions found in the lower jaw.

As to their origin, root-cysts are believed to occur in connection with chronic inflammations of the peridental membrane. They are by far the most frequent. Of 416 cases of cysts which Rosenstein* observed, 394 were root-cysts, 13 follicular cysts, and 9 could not be determined. Astachoff† examined 98 pieces from jaws carrying gangrenous teeth, and in these found 36 root granulomas and 52 root-cysts. Not rarely the root projects into the cystic cavity; in larger cysts several roots may be found.

Follicular cysts are independent of caries of the teeth, and as a rule occur during the second dentition. They are believed to originate from dilatation of a tooth follicle or misplacement and malformation of a tooth germ. Very frequently they contain one tooth, less frequently several teeth, the crowns of which are directed toward the lumen. Sometimes the tooth is lacking in the alveolar process where the toothlike cyst is located.

Multilocular cysts belong to the class of solid epithelial tumors in the central portion of the jaw. This is simply the stage preceding the cyst formation.

Root-cysts and follicular cysts are very much alike as to their form and growth. The most characteristic feature of all is the frequent presence of squamous epithelial cells which occur as plugs or ten-

* "Zur Klinik der Kieferzysten," *D. Monatsschr. f. Zahnheilk.*, 1912, xxx, 160.

† "Ueber die Pathogenese der Zahnwurzelzysten," *D. Monatsschr. f. Zahnheilk.*, 1909, xxvii, 644.

drils extending through the granulation tissue, or as a lining of the cystic cavity. They also occur in root granulomas, which so frequently develop into root-cysts. Römer,* who examined 100 specimens of root granulomas, divides them into two distinct classes according to the presence or absence of epithelial cells. The latter type is called by him "simple granuloma," and Römer maintains that such granulomas never develop, in fact never can develop, into cysts for the very reason that they do not contain any epithelial cells.

According to most writers these epithelial cells are derived from the so-called *débris épithéliaux paradentaires* of Malassez, *i.e.* the cell clusters and cords which occur almost constantly in the peridental membrane in man and the higher animals. There is not yet absolute agreement among authors as to the origin, nature, and function of these cells. The majority of recent writers consider them as the remains of that portion of the enamel organ which, as Hertwig† and Von Brunn‡ have shown, normally extends downward as an epithelial sheath around the root. After the eruption of the tooth this sheath is gradually broken up by the fibers of connective tissue which extend from the alveolar periosteum to the dentin of the developing root; but remnants persist throughout life.

BLACK'S GLANDULAR EPITHELIAL CELLS.

The histologic structure, distribution, and arrangement of these cells have been thoroughly studied and well described, among other recent writers, by Noyes§ and Black.* These two authors are inclined to doubt the mere embryonic character of these cells. Noyes, although he accepts their embyronic origin, considers it as apparently improper and illogical to suppose that embyronic débris would persist through life, if it were useless to the organism. He is guarded in his statements concerning the possible function of these cell clusters, because of the failure of extensive attempts to discover a connection with the epithelial cells lining the gingival space, or a duct or a lumen, in these strings.

Black expresses more positive views. According to him, the epithelium of the enamel organ, as it breaks up and floats away, is absorbed and disappears completely. "These cells," he writes, "seem to have nothing whatever in common with the epithelial cells scattered in strings in the peridental membrane. They are not like them. They do not seem to be of the same quality at all." He is inclined to consider them as glandular structures. "These cells must, as a whole, be regarded as glandular. I know of no other term to apply to them, although they have no ducts and in many respects are out of form as glands." Black, therefore, emphatically contends that the epithelial cells occurring in the peridental membrane are of two kinds, unrelated to each other; that those derived from the epithelial root-sheath are being absorbed and disappear completely, a process which, he claims, may be observed and confirmed by anybody who will take the pains to study it properly; and that those which persist through life in the peridental membrane are not like the other cells, but are normal to this tissue and may have a glandular function. It is, however, not clear from his statements whether there have been as conclusive studies made by him or others of this second type of cells. We are not informed when these cells appear, whether they may coexist with the first type, or whether they present any differential histological features, and no suggestions are made as to their origin.

---

* Römer, "Periodontitis chronica hyperplastica circumscripta," *Scheff's Handb. d. Zahnheilk.*, 1909, ii, 1 Abt. 673.

† Hertwig, "Entwickelungslehre," Jena, 1906.

‡ Von Brunn, "Ueber die Ausdehnung des Schmelzorgans und seine Behandlung für die Zahnbildung," *Arch. f. mikrosk. Anat.*, 1887, xxix, 367.

§ Noyes, "A Textbook of Dental Histology and Embryology," Philadelphia and New York, 1915.

* Black, "A Work on Special Dental Pathology," Chicago, 1915.

Adloff* likewise insists on making a sharp distinction in the epithelial cells of the peridental membrane which it has been customary, since Malassez, to call as a whole *débris épithéliaux paradentaires.* These may be genetically all the same, but they differ greatly in their further development. There are, on the one hand, those buds and secondary outgrowths of the enamel ridge which are exceedingly frequent during the embryonic development of the human teeth in the various developmental stages, and on the other hand, remnants of the epithelial sheath. The former are genuine embryonic structures, their function being limited to embryonic life. The latter continue to functionate until the growth of the root in length has been completed, *i.e.* during a considerable time of extra-uterine life, and being absorbed when this function is fulfilled; cells from this sheath are remnants of a used-up organ, hence they lack the growth-energy of the other type of cells when they become active again in a granuloma or a cyst.

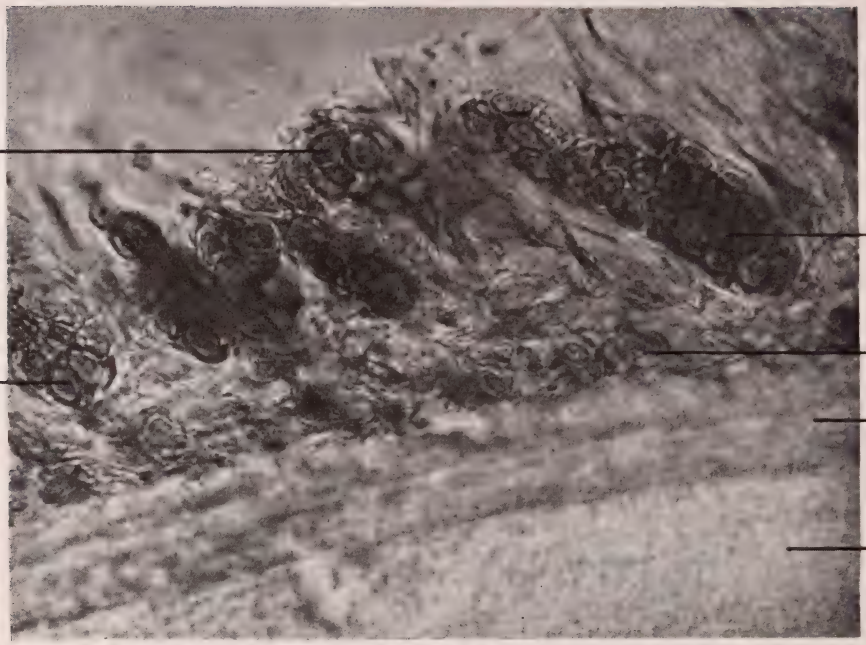
Fig. 1.

A section cutting diagonally through the root, showing the network of epithelial cords. *E.c.*, Epithelial cells. *D.*, Dentin. *Cm.*, Cementum. *F.*, Fibers.

Black's statement, that the epithelial cells which persist in the peridental membrane through life must be regarded as glandular, is not yet supported by any

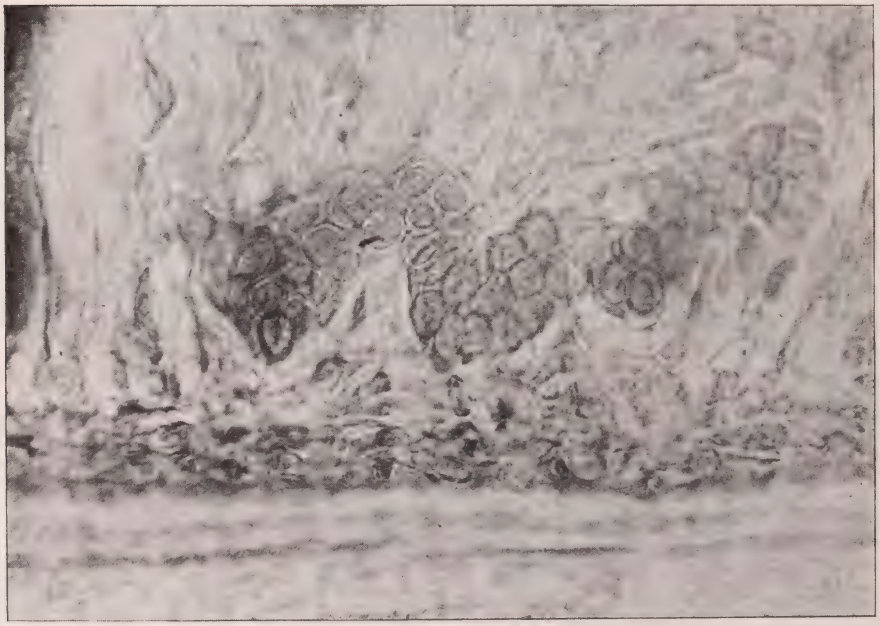
* Adloff, "Zur Frage der Herkunft des Epithels in den Wurzelzysten," *D. Monatsschr. f. Zahnheilk.*, 1912, xxx, 188.

FIG. 2.



Epithelial cell cords almost in direct contact with the cementoblasts.

FIG. 3.



Similar to preceding illustration.

proof; but it can hardly be denied that structures which, as he contends, are normal to the peridental membrane, and constant elements in so highly an important tissue, may have some physiological function to perform. Illustrations of these cell cords in Noyes' textbook, and casual remarks in the literature, hint at the possibility that they may be in some way connected functionally with the cementum. Noyes describes them as being surrounded by an extremely delicate basement membrane. "They lie very close to the surface of the cementum, winding in and out among the fibers. They anastomose and join with each other, forming a network, the meshes of which are comparatively close in the gingival portion and comparatively wide in the apical portion." (Fig. 1.) He calls attention to the observation that "The ends of the loop toward the cementum often show enlargements which in some cases apparently lie directly in contact with the cementum." (Figs. 2 and 3.) Astachoff,* who examined 98 specimens from jaws, also observed the close proximity of the epithelial "cell islands" to the cementum. In one case of a cyst he found them even in eroded depressions of the cementum. He writes of them, "They are similar to the odontoclasts, or they replace to some degree, as an epithelial sheath, the bundles and cells of the peridental membrane which are lacking here."

Dreuw and Rumpel† go still farther in claiming that "The epithelial nature of these cells is not yet indisputably established as hitherto generally believed. Investigations are still to be made to ascertain whether these cells are derived from the connective tissue cells proper, or from the endothelial, respectively perithelial cells, or whether they are to be brought in connection with the cementoblasts, which in their processes, nucleus, and protoplasm resemble in several respects the peculiar cell forms described by us."

* Astachoff, *loc. cit.*

† Dreuw and Rumpel, "Ueber eigentümliche Zellformen bei Zahngranulomen," *Virchow's Arch.*, 1910, cc, 89.

HERTWIG'S SHEATH.

It is, indeed, striking what a degree of differentiation cells of the connective tissue type may attain. The odontoblasts which are formed from the cells of the pulp, *i.e.* from connective tissue cells, are high columnar cells, and resemble much more epithelial cells than the cells in Malassez' *débris épithéliaux paradentaires.* It may be worth while to review some of the statements of embryologists concerning the structures from which these cells are considered to be derived. To Von Brunn* we owe the best description of the enamel organ and of the so-called epithelial root-sheath, which is frequently called after him "Brunn's sheath," but, as proposed by Brunn himself, more properly called Hertwig's sheath, Hertwig having described it first.

Von Brunn calls attention to the fact that in rats the summits of the crowns of the molars are free from enamel; immediately after the eruption of the teeth the dentin is already freely exposed on the outer surface. The incisors of rodents are provided with enamel only on the front surfaces; also the summits of these teeth are enamel-free at the time of eruption. The incisors of these animals have no roots. Yet at an earlier stage of development these teeth have a complete covering of enamel epithelium like other teeth. Tomes† also found that in the armadillo, whose teeth are absolutely free from enamel, the tooth anlage nevertheless begins with the formation of a complete enamel organ. In the eel and various fishes the enamel organ likewise extends very much farther than the final very small enamel cap.

The question naturally arises, What has the enamel epithelium to do in those places where subsequently no enamel is being developed? Von Brunn showed that its purpose is that of giving form to the tooth, and that the function of enamel formation is only an accessory one. He writes, "Its presence is evidently necessary in order to the odonto-

* Von Brunn, *loc. cit.*

† Tomes, quoted from Von Brunn.

blasts' being properly placed, namely, against its inner surface; it forms the matrix for the later dentin substance. When the odontoblasts are placed in the proper position, when the first dentin layer is formed and in this way the shape of the tooth secured, the enamel epithelium has played its part for this portion of the tooth; now the fixation and fastening of the tooth can begin, and the connective tissue performing this work may destroy the mold." "I must emphasize in particular," he states, "that the first odontoblasts are always found at some distance from the free border of the epithelial sheath, and that from this I draw the conclusion that the presence of the epithelial sheath is the *conditio sine qua non* for the formation and arrangement of the odontoblasts, and thus of the dentin itself."

Quite novel are the views which Fischer* holds in regard to the ultimate fate of the enamel epithelial sheath. He claims that this epithelium, after having fulfilled its mission of enamel formation, by no means is resorbed and disappears or forms the enamel cuticle, as believed by some authors, but it continues to differentiate and becomes again typical epithelium of the mucous membrane. As the crown of the tooth breaks through, the flanks of the persisting enamel epithelial sheath try to establish a communication with the proliferated external epithelium of the mucous membrane, after having sent forward short buds and plugs into the surrounding connective tissue. The cylindrical matrix of the youngest enamel epithelium gradually passes over into the older cubical cell form, while the layer of ameloblasts, which is still present at the time of the perforation of the tooth, exchanges its cylindrical form with the cubical only later. Co-operating with the external epithelium, it finally produces the tissue proliferation which forms the later papilla of the gingiva. He states that the importance of this "return" of the enamel epithelium to the mother tissue, of this "new characteristic" of all epithelium involved in the development of the teeth, is particularly emphasized when we consider the activity of the epithelium from the phylogenetic standpoint.

The most primitive form of dentition consists in a bulging out or an evagination of the epidermis into which a papilla of mesodermal connective tissue pushes from beneath. In the lower jaw of the pike we find for the first time the tendency of the epithelium to grow downward or to invaginate into the mesodermal tissue as a tooth germ, but without ever losing the connection with the mother epithelium. In amphibia we have both simple epithelial evaginations and invaginations into the depth, which, however, always remain in continuity with the mucous membrane. In reptilia the line of teeth may separate completely from the epithelium of the jaw, leaving only a few rudiments.

In all higher vertebræ the epithelium forming the teeth is regularly being snared off from the mucous membrane for a definite time, but when its mission is fulfilled it is differentiated back into the mother tissue. Remnants of epithelium may, nevertheless, be left in the depth of the jaw and persist as indifferent cells. These correspond to Malassez' *débris épithéliaux paradentaires.* These are, however, not differently sized collections, scattered irregularly and independent of one another, as represented by Malassez and his followers, but constitute a large wide-meshed network, which is being formed as the cementoblasts break through an originally solid epithelial sheath. This epithelium wound like a net around the root, and which morphologically belongs to the epithelium of the mucous membrane, may have retained enough regenerative energy so that in a case of cyst formation it may line the cystic cavity.

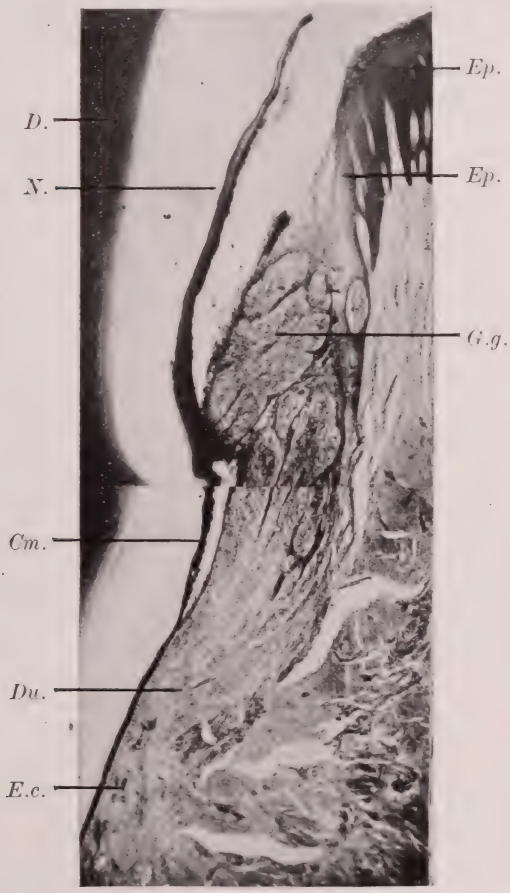
Apparently Fischer stands alone with his view of a return of the epithelial cells to the mother tissue—morphologically and functionally like it.

Granting that the epithelial cords of

* Fischer, "Beiträge zum Durchbruch der bleibenden Zähne und der Resorption des Milchgebisses," *Anatomische Hefte,* 1909, xxxviii, 617.

the peridental membrane, in general, are remnants of Hertwig's sheath, it is still possible that there are other cells of an epithelial nature in this tissue, derived from other sources, *i.e.* the mucous membrane of the mouth. Dependorf* and other writers have called attention to the fact that the papillary bodies of the gingival mucous membrane proliferate under the slightest provocation; the tips of these papillary extensions are easily snared off, and may be found as pearls and nests in lower regions about the teeth. Noyes is not disinclined to regard as possible a downward extension of the squamous epithelium of the mucous membrane of the gingiva and the gingival space as the crown breaks through.

Fig. 4.



Longitudinal section through the gingivæ on the proximal side. *Ep.*, Epithelium lining the gingival space. *G.g.*, Gingival gland, so called. *D.*, Dentin. *N.*, Nasmyth's membrane. *Du.*, Duct-like structure from the epithelial cord seen at *E.c.* *Cm.*, Cementum separated from the dentin by decalcification.

* Dependorf, "Zur Pathogenese der Zahnwurzelzysten," *D. Monatsschr. f. Zahnheilk.*, 1912, xxx, 809.

Indeed, his illustrations strikingly reveal the seeming continuation of the direction of such cords from the depth of the membrane to the mucous membrane. (Fig. 4.)

ORIGIN OF EPITHELIAL CELLS IN ROOT-CYSTS.

While by the majority of writers the theory is adhered to that the epithelial cells occurring in root-cysts and root granulomas originate from the cell cords within the peridental membrane, an entirely different view is held by Grawitz.* This author believes that epithelial cells lining cysts are always derived from the squamous epithelium of the mucous membrane of the mouth. Every cyst begins with abscess formation within the granulation tissue. Epithelization of the cavity does not take place unless the pus reaches the surface of the mucous membrane through a fistulous tract. If this does occur, the squamous epithelium of the mouth grows downward and covers the wall of the duct as well as that of the cystic cavity. A closed cyst is formed if the fistula heals after it has been lined. According to him only the genuine odontogenous cystomas are derived from embryonic enamel epithelium.

Adloff† and Schuster‡ cite cases which they believe speak in favor of such an origin. Schuster, however, believes that the epithelial invasion from the squamous epithelium of the mouth does not necessarily depend on the formation of a fistula. Distal portions of proliferated papillary bodies of the mucous membrane may be snared off by the connective tissue and remain as an epithelial cell nest in the peridental membrane, and give rise to an epithelial invasion of a granuloma or cyst. He points out that if cell remnants of the enamel organ are the origin of the epithelial cells in cysts and granulomas, the structure of this organ should be found reproduced to some extent. This is strikingly the case in cystomas, while the epithelial cells in a root-cyst show a marked resemblance to those of the mucous membrane.

The majority of writers, however, consider as untenable the views held by Grawitz. Astachoff,* who examined specimens from 98 jaws with the teeth *in situ,* did not find a single case which might be used as proof of this theory, Dependorf† points out that the epithelium appears in the granuloma early, before a cavity formation sets in, and that in fresh melting-down processes in encapsulated granulomas the tendency of pus to break through is rarely observed; the encapsulated focus remains restricted and is soon surrounded by epithelial cell tracts.

Perthes‡ advances the following arguments in refutation of Grawitz' theory: (1) The occurrence of epithelium in completely solid granulomas excludes the supposition that it owes its existence to the lining of an abscess. (2) The free movability of the mucous membrane over the cyst and the absence of a fistulous tract speak against it. (3) From clinical experience it is observed that a root-cyst never develops from a chronic abscess with a fistula. (4) Growth of a cyst such as is observed could not be accounted for if there were a communication from the cyst to the oral cavity, since the content of the cyst would be poured out constantly or at intervals.

While there is still such division of opinion in regard to the origin of the epithelium in root-cysts, authors generally agree concerning the genesis of follicular cysts and cystomas. The former, although in form and growth very similar to the root-cysts, have some characteristic features which make the origin rather obvious; the location, the time of development, and the content speak for an embryonic starting-point, namely, a misplaced or malformed tooth anlage. As to the latter, we may, from their his-

* Grawitz, "Die epithelführenden Zysten der Zahnwurzeln," Greifswald, 1906.

† Adloff, *loc. cit.*

‡ Schuster, "Zur Frage der Herkunft des Epithels in Zahnwurzelzysten," *D. Monatsschr. f. Zahnheilk.*, 1908, xxvi, 840.

* Astachoff. *loc. cit.*

† Dependorf, *loc. cit.*

‡ Perthes, quoted from Schuster, *loc. cit.*

tological structure, rightfully believe that the epithelium in these tumors is derived from the enamel organ, the structure of which is strikingly reproduced in the tumor tissue.

ETIOLOGY OF ROOT-CYSTS.

Root-cysts result from chronic inflammations of the peridental membrane. The first impulse is given by inflammatory changes of the connective tissue, which are due to various influences, mechanical and chemical, but chiefly bacterial. Moorehead, in his extensive clinical experiences, found root-cysts almost invariably to arise from infected tooth-roots. He calls this type "infection cyst," in order to emphasize the distinction from follicular cysts which develop in the absence of caries of the teeth and apparently are unrelated to infectious processes of any kind. Proell* considers the granulation tissue which is being formed as a measure of protection on the part of the tissue surrounding the tooth against bacterial invasion. The next phase is the effect of the granulation tissue on the epithelial cells in the peridental membrane, which are in a state of repose as long as the root membrane is perfectly healthy, but awake from their slumber when this is altered.

Partsch† has seen distinct changes take place in these epithelial cells under the influence of an inflammation of the connective tissue. Vascular loops formed in the course of hyperplastic changes push out toward the cell nests and force them to give up their globular form, so that they lie like a cap over the loops. Dependorf‡ believes he has seen the beginning proliferation of the resting epithelium. The former may occur before the formation of granulation tissue; the latter only sets in when this is present. Wherever degenerative processes occur in the granulation tissue, the epithelium shows the tendency to surround and encapsulate such foci. This is the beginning of cyst formation. Strands grow out from this epithelial layer into the granulation tissue and encircle and snare off other regions which, being cut off from the surrounding tissue, are poorly nourished, and hence the tissue undergoes degenerative processes. When these are complete the epithelial barrier is also dissolved and the detritus added to the cystic content. Some authors are emphatic in stating that the cyst begins chiefly through participation of the connective tissue, others that it begins with degenerative processes in the epithelium.

The peculiar behavior of the connective tissue toward the epithelial cells and *vice versa* produces most varied and often very strange pictures, which have given rise to various comparisons. Proell likens it to a mucous polypus, which seizes an object with its two main arms and incorporates it; when the two arms have closed around an area of granulation tissue a cyst is being formed. Witzel* compares such region of proliferation to a bath sponge, the supporting scaffold of which is the epithelium, while granulation tissue fills the alveoli. Römer† speaks of "Epithelglocken," epithelial bells. Dreuw and Rumpel lay stress on the islands of connective tissue marked off by the epithelial cells, which they call "Plasmominseln," inasmuch as they are filled with plasma cells.

As to the fluid which occupies the cyst, Fischer‡ believes it is due to mucinous softening of the surrounding connective tissue; a cyst fluid proper is formed which passes through the epithelial layer and fills a space lined with epithelial cells. Also an inflammatory

* Proell, "Zur Mikroskopie der Granulome und Zahnwurzelzysten," *D. Monatsschr. f. Zahnheilk.*, 1911, xxix, 161.

† Partsch, "Zur Pathogenese der Zahnwurzelzysten," *Allg. mediz. Centralzeit.*, 1910, lxxix, 20.

‡ Dependorf, *loc. cit.*

* Witzel, "Ueber Zahnwurzelzysten, deren Entstehung, Ursache und Behandlung," *D. Monatsschr. f. Zahnheilk.*, 1896, xiv, 305.

† Römer, "Epithelgranulome in Zahnwurzelzysten," *Handb. d. Zahnheilk.*, 1909, ii, 676.

‡ Fischer, "Experimentelle Unterschungen über die Entwicklung folliculärer Zysten," *D. Monatsschr. f. Zahnheilk.*, 1911, xxix, 188.

exudate may diffuse through the thin cellular wall, according to him. Partsch disputes the formation of a cyst by liquidation of the epithelial cells, as Dependorf claims. If this were the case we should find epithelial cells in some form of transition or degeneration within the cystic cavity; this, however, is never observed. He holds the view that fluid accumulates in the space between the root and the granuloma, and thus a cyst is formed. This is not admitted by others on the ground that under these conditions the bare root should be found in every cyst.

An examination of a number of cysts such as I have made during the past year is peculiarly fascinating on account of the great variety of the histological features which they present. No two cysts are alike. Certain elements appear in nearly all of them, such as epithelial cells and plasma cells, but chameleon-like they change their appearance continually, and with almost every specimen we find differences in the arrangement, the location, the amount present, the size, and the staining qualities. The alterations are sometimes so marked, the disguise so complete, that it is often extremely difficult, if not almost impossible, to identify them.

SOME FEATURES OF DENTAL CYSTS ABOUT WHICH LITTLE IS KNOWN.

Descriptions of the histology of dental cysts abound in the literature; I will therefore limit myself to reporting some features which are considered as being very rare or have scarcely been mentioned, and to pointing out others which have not been discussed at great length.

A cyst lined on the outer wall with epithelial cells is an extremely rare occurrence. Adloff* reported two such cases. In both, ciliated columnar, respectively cylindrical and squamous, epithelial cells were found; both had fistulæ lined with cylindrical cells which passed over into the squamous epithelium or the outer wall. Proell† described a cyst which was lined with ciliated epithelial cells on the inner and outer wall; there was no fistulous tract in his case. Both authors are of the opinion that these cells were derived from the lining of the maxillary sinus. According to Adloff, fistulæ are present in all cysts at some time; the absence of one in Proell's case simply indicates that it had healed completely. Although he admits that the cells of the body in general retain with great persistence their specific properties, he considers the squamous and cubical cells in his two specimens as being derived from the same source, *i.e.* the ciliated cylindrical cells of the antrum, a transition having gradually taken place from the ciliated cylindrical to the squamous type.

Römer, who observed a cyst lined on the inside with ciliated and squamous epithelial cells, objects to this conception of a transition of one type of cells to another, and believes that, in addition to Malassez' epithelial remnants, aberrant epithelial germs of the antrum could be taken into account. It would seem that the possibility of such an origin cannot be absolutely denied in Adloff's cases. One of these was associated with some noteworthy peculiarities. In a girl sixteen years of age the upper first molar had three roots, to each of which a granuloma was attached; two of these were of the simple kind, the third was the cyst described by him. He admits that the epithelium in the two former, as in all granulomas, was derived from the epithelial remnants; in the last, he believes, it originated from the antrum, and he states that "Thus for the first time the proof has been given that an epithelization of a granuloma may take place from the outside." "It is very remarkable," he continues, "that squamous epithelium analogous to that of the mucous membrane of the mouth has never yet been demonstrated on the outer wall of a cyst."

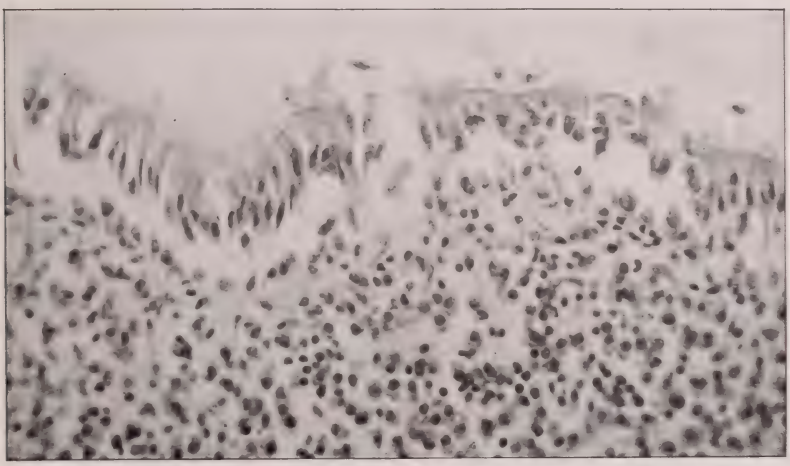
From these considerations the questions arise as to why an outside lining is so extremely rare; whether a fistulous opening is necessary to invite a growing downward of the epithelium, or whether,

* Adloff, *loc. cit.*

† Proell, *loc. cit.*

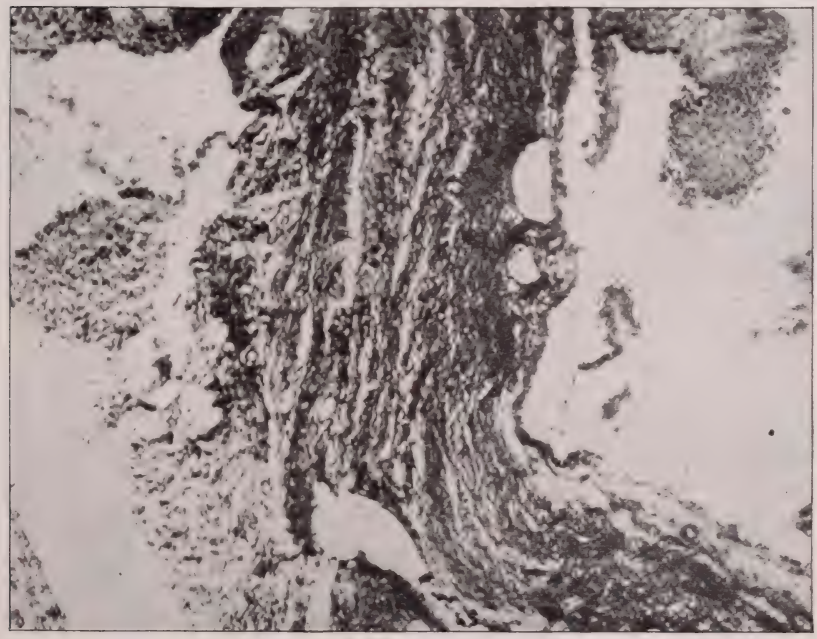
in the few rare cases observed, the covering of the outside wall with epithelium follows or precedes the lining of the duct. I have a cyst in my collection in which a cleft extending from the interior to the outer wall is lined with stratified squamous epithelium which is continued over the curved edges and on the outer surface for a distance, when it ceases entirely.

Fig. 5.



Ciliated columnar epithelium lining the inner surface of the cyst.

Fig. 6.



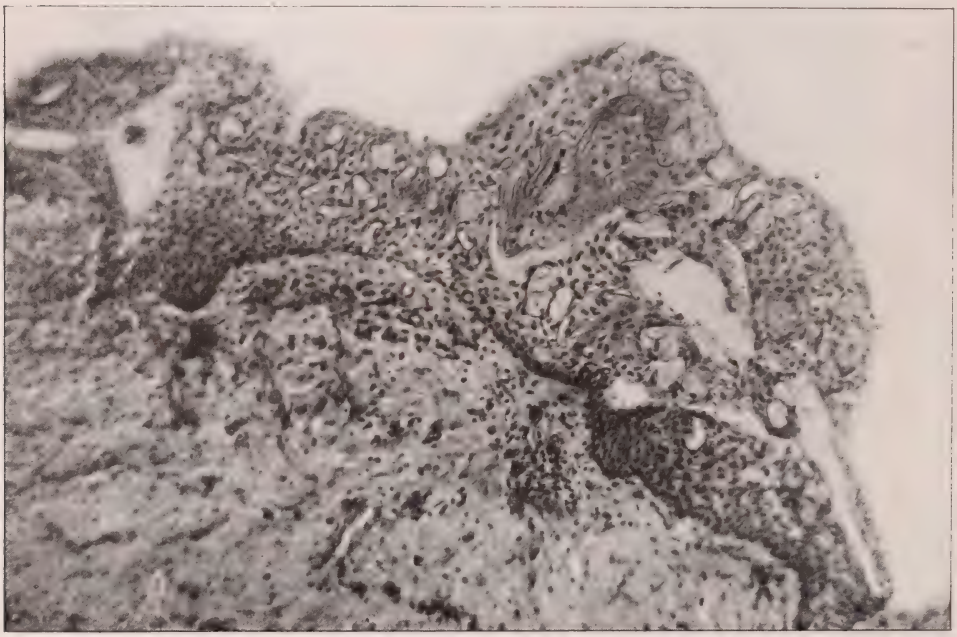
Columnar epithelial cells on the outer and inner walls of the cyst.

Another cyst, 5 × 7 mm. in diameter,

formed a complete closed sac with projections on the outside wall resembling the rootlets on a green onion or a radish. On microscopic examination the inner wall was found to be irregular from rounded papillary protuberances and throughout lined with epithelial cells. These often form a single layer resting on a basement membrane; they are almost round and a little separated one from another, so that they look like beads strung loosely together; or they have one or two short processes on the free surface, or become more oblong and even spindle-shaped and may be present in several rows. Finally we come to portions where we have ciliated high columnar epithelium which rests on a basement membrane, or it is the last row of a layer of epithelial cells, the innermost of which consists of nearly spherical cells. (Fig. 5.) In some places the layer of ciliated cells is detached *en bloc,* or the cells lie loosely scattered, leaving the impression that originally the entire inner wall was lined with ciliated columnar cells.

The larger part of the cyst wall consists of connective tissue in rather dense fibers. Sections through regions with outgrowths on the outer wall show that the latter are lined with cells like those covering the inner wall, except that they are not ciliated. (Fig. 6.) This lining is continued from these papillary extensions on the outer cyst wall proper for a short distance. There are no nests or strands of epithelial cells within the cyst wall, as otherwise is generally found. A trace of a fistulous duct is nowhere to be seen. It is noteworthy that the ciliated columnar cells sometimes rest on several rows of polyhedral or spherical cells, the latter resembling those of the lower strata of the squamous epithelial cells of the oral mucous membrane. Since a direct extension of the epithelium of the maxillary sinus on and into the cyst cannot be demonstrated in this case, aberrant

Fig. 7.



Protuberances on the inner wall of the cyst; angiomatous in structure, and in the state of marked hyaline degeneration.

germs of this epithelium may be considered as the origin of the epithelial lining of the cyst.

VASCULAR CHANGES IN DENTAL CYSTS.

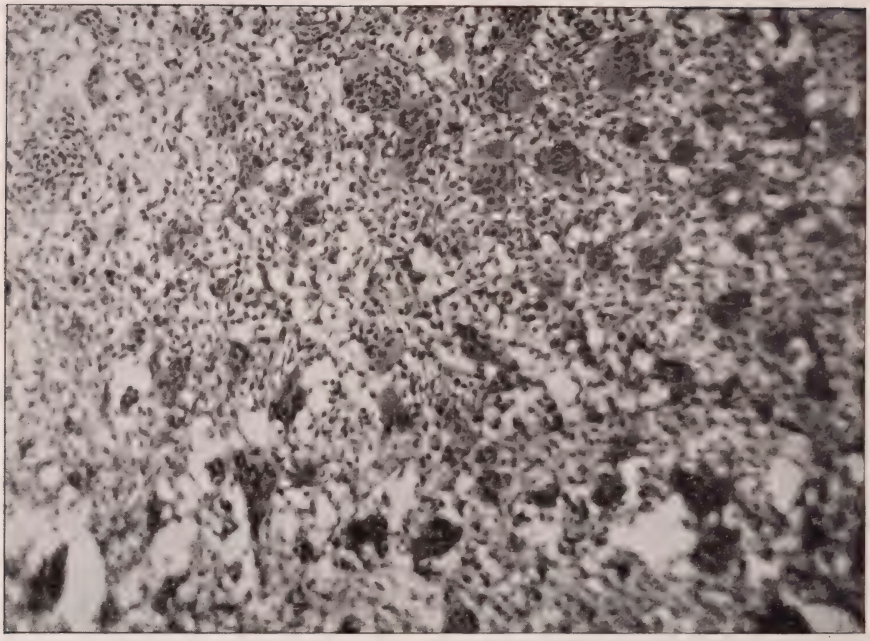
There are only brief remarks in published reports about the vascular changes in cysts. Because of unusual features connected with such changes two other cysts of my collection may be described. One of these is a large cyst involving the right upper jaw which had destroyed the anterior wall of the maxillary sinus. The cyst wall was of uneven thickness. In its thinnest portion small round bead-like projections were seen on the inner surface with the naked eye. In microscopic sections through such areas the inner wall, as well as the protuberances, is lined with a layer of stratified epithelial cells which is rather narrow over the straight surface. Within the projections curious-looking structures are found which stand out conspicuously by reason of their form and coloring. They are homogeneous masses of most bizarre forms—flattened disks, bars, curved sausage-like or straight, round and oval structures, often winding in and out and resembling greatly enlarged renal glomeruli.

Fig. 8.

Similar to preceding illustration.

A perceptible lumen is rarely found, but there is often a dark line in the center. (Figs. 7 and 8.) They are evidently newly formed capillary vessels (lymph or blood) which have undergone a wholesale hyaline degeneration, and in this process have swollen enormously and increased the bulging of the epithelial wall produced by the formation of these loops of vessels. Calcification is present here and there. In some places greatly enlarged epithelial cells are seen which also have undergone complete hyaline transformation. Occasionally there is a

FIG. 9.



Section through giant-cell fibro-sarcomatous tissue adjacent to the cyst. Giant cells in the immediate neighborhood of spaces.

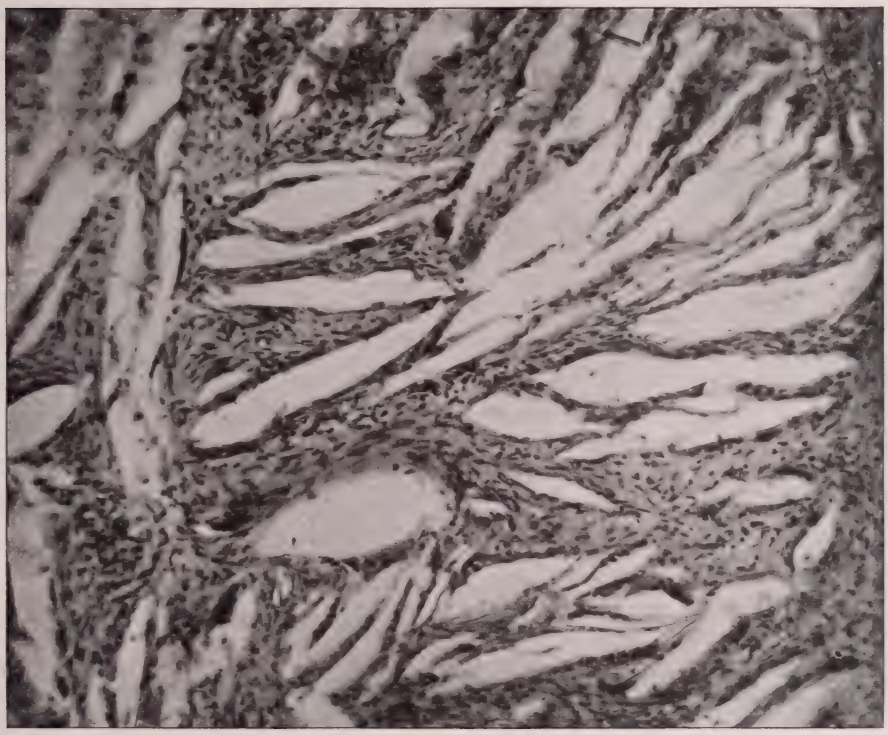
FIG. 10.

Intricate network of spaces, many containing blood corpuscles.

granular material in place of the homogeneous structures. All these changes are strictly limited to the rounded protuberances.

This cyst presented another interesting feature. Large areas, in regions where the tissue assumes the character of a tumor, are occupied by an intricate network of large spaces and slits, frequently containing blood. The borders are generally well cut, occasionally lined with cells resembling endothelial cells; more often a nearly homogeneous tissue forms the boundary line; frequently syncytial masses with numerous nuclei are leaning against the wall, and sometimes invading the lumen. (Fig. 11.)

Fig. 11.



Formation of syncytial masses about spaces in tissue adjacent to a cyst.

Almost identical pictures of spaces, hyaline degeneration, and syncytium or giant-cell formation are present in another cyst associated with a giant-cell fibrosarcoma, which was removed from the lower jaw of a boy of eight years. The syncytial cells are here obviously formed from connective tissue cells and plasma cells. Besides the lancet-shaped spaces with sharply cut edges and corners we have here a system of larger and smaller spaces with irregular borders; the edges have a tendency to be bayed out and rounded off; frequently globular and club-shaped masses of a richly cellular fibrous tissue project into the lumen. (Fig. 9.) There is no blood in these spaces. Syncytial structures are rarely seen in the immediate neighborhood; there are numerous giant cells, but they remain at some distance. The tissue is frequently altered beyond recognition. The inner lining of squamous epi-

thelial cells is present only in fragments. How far the space formation may go is illustrated in another cyst. (Fig. 10.)

The giant cells and syncytial cell complexes occurring in cysts of the dental system, and particularly in epulis, offer the most favorable conditions for studies of their genesis and development. They present the greatest variability of structure and form. In the last two cysts which I described, the form of the polynuclear cell masses is such as to make the name syncytial masses seem more suitable. They follow the lines of the spaces, are more or less broad bands, or masses having one or two lateral processes or one end projecting into the lumen. They stand out conspicuously in the tissue by reason of their intense staining. (Fig. 11.) They sometimes assume unusual proportions. Quite different are the masses which are found in the so-called giant-cell fibroma or sarcoma. Here they have the more typical round form, and frequently are more faintly stained than the surrounding tissue. Giant or syncytial cells of dental cysts and tumors develop from all sorts of cells. Their origin from endothelial cells of blood and lymph vessels is very apparent. In epulis the giant cells often have the form of capillaries, and the nuclei may be peripherally placed and form an entire circle. More often complete occlusion of the vessels has taken place and the whole structure appears transformed into a giant cell with a pearl-like arrangement of the nuclei. Other capillaries of such tissue may be filled with a grumous or entirely homogeneous material without nuclei. Besides endo- and perithelial cells, other cells, as fibroblasts, squamous epithelial cells, and plasma cells, may give rise to giant-cell formation. The development is often that of fusion of the protoplasm, and from all appearances frequently results from degenerative processes.*

* All of the material used in the above studies was obtained from the surgical clinic of Dr. F. B. Moorehead.

The Nature of Pericemental Abscesses upon Vital Teeth.

By Dr. MAURICE ROY, Paris, France,

PROFESSOR AT THE DENTAL SCHOOL OF PARIS, DENTIST TO THE HOSPITALS OF PARIS.

THE fact most frequently invoked to justify the analogy of pyorrhea alveolaris with the formation of gouty tophi is that of a rare form of the disease characterized by the formation of alveolar abscesses upon vital teeth, which in part evolve similarly to abscesses due to the death of the pulp. The teeth in question are living; the gum appears to be intact at the cervix of the teeth, and the abscesses appear to develop upon the middle portion of the root without other apparent communication with the exterior than the fistula resulting from their opening upon the surface of the gum.

Burchard* says: "A tooth exhibits the symptoms of acute apical pericementitis; a bistoury passed into the apex of the swelling over the root may give vent to a glairy, mucus-like discharge, or, in

* H. H. Burchard, "Varieties of Dental Calculi," DENTAL COSMOS, 1898, vol. xl, p. 8.

some cases, pus flows. A further examination may reveal the loss of underlying alveolar wall; on exposing the root, which is partially denuded of pericementum in this area of denudation, the presence of a calculus is detected. The pulp responds to tests for its vitality, and the gum margin and marginal pericemental attachment appear to be intact."

Kirk* describes the observed symptoms as follows: "The clinical phenomena attending the evolution of this condition are in general those of other inflammations of the pericemental membrane, but modified somewhat as to their violence. A slight uneasiness about the root of the affected tooth is first felt, followed by increasing tenderness to percussion, a slight extrusion of the tooth from its alveolus, increasing pain of a dull, throbbing character, localized swelling which does not become diffused over a large area, no tendency to the infiltration of surrounding tissues, no burrowing of pus into adjacent territory, finally localization and pointing of the abscess and evacuation of the inflammatory products upon the gum surface at a point close to the inflammatory focus. The discharged contents differ from the pus of the usual dento-alveolar abscess of pulp infection, both as to quantity and general character, being relatively slight in amount and mucoid or glairy in appearance, sometimes streaked with blood, and not so yellowish as pus due to infection by pyogenic cocci. After evacuation of the abscess cavity the outlet usually heals spontaneously, and the disorder remains quiescent for a greater or less period, when a renewal of the outbreak may occur, with a tendency to repetition indefinitely until the tooth is finally lost through general necrosis of its retentive ligament, the pericementum."

In order to explain the formation of those abscesses whose nature hitherto has appeared to be very difficult to determine, a number of authors assume that it is a question of gouty tophi of calcium urates, deposited upon the root through the medium of the circulation, and thereby causing an abscess by hematogenous infection. Kirk interprets these abscesses as the consequence of hematogenous infection of the pseudo-glands of Black.*

Having had occasion to observe some such cases whose pathogenesis is very obscure, and having been able to establish their real etiology with absolute clearness, it seems to me advisable to insist very particularly upon a point which to my knowledge has not yet been noted, and which reduces to *nil,* in the cases I have observed, the deductions in favor of gouty tophi.

Cases of this kind are very rare, and many experienced practitioners have never encountered them. Consequently the first case which I had an opportunity to observe upon an upper central incisor some fifteen years ago made a vivid impression upon my mind. Being unable to find any other plausible explanation, I was inclined to accept the belief in the reality of gouty tophi in the pericementum without communication of the alveolo-dental articulation with the exterior. Nevertheless my mind was not satisfied, and some years later, having had occasion to observe a similar case, I examined and explored the tooth in question with the greatest attention, and was overjoyed to find the explanation of the fact which had so greatly puzzled me.

The patient was an arthritic man of sixty years whom I had long known, still

* E. C. Kirk, "Abscesses upon Teeth with Living Pulps," DENTAL COSMOS, 1898, vol. xl, p. 621.

* [In the paper quoted by Dr. Roy I merely suggested as a possibility that pericemental abscesses might result from hematogenous infection. In a later paper[1] I called attention to Black's observation of the direct infection of the epithelial rests of the peridental membrane through the gingival tissues, an observation which clearly determines the modus of infection in pericemental abscess as well as in pyorrhea alveolaris, which, though differing in clinical expressions, are pathologically identical.—EDWARD C. KIRK.]

[1] E. C. Kirk, "The *Locus Minoris Resistentiæ* in Pyorrhea Alveolaris," DENTAL COSMOS, vol. lv, 1913, p. 577.

possessing all his anterior teeth as well as his premolars. These teeth were firm, and showed only a few evidences of a mild pyorrhea in the region of two of the premolars, which nevertheless were still quite firm. This patient one day came to me with a vestibular abscess lying half a centimeter above the marginal border of the gum of an upper lateral incisor, an abscess absolutely analogous

I was about to accept this conclusion, in the absence of a better one, when, while carefully exploring the abscess with a fine probe through the small gingival fistula so that I might gain a better idea of its configuration, I perceived that this vestibular abscess encircled the approximal surface of the tooth, and appeared to extend backward toward the palate.

Fig. 1.

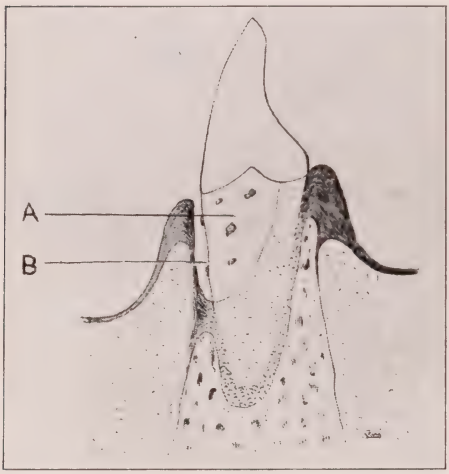


Fig. 2.

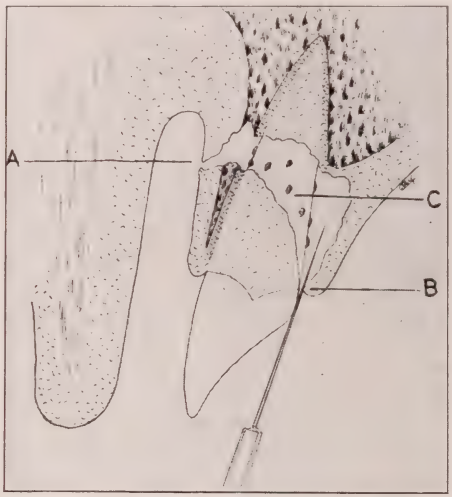


Fig. 1: Pyorrhea with pocket as commonly observed. A, Portion of the denuded root with calcareous deposits. B, Pyorrhea pocket.

Fig. 2: Pericemental abscess on a living tooth. A, Showing orifice made by the abscess, which does not communicate with the neck of the tooth at the gingival border, where the tissues are intact. B, Opening made by the pyorrhetic infection. A probe is introduced to show the opening into the pocket. C, Portion of the denuded root with calcareous deposits, showing the progress of the infection.

with those which currently are observed in the course of complications sequent to the death and putrefaction of the pulp. Yet the tooth incontestably had a vital pulp, as it responded to thermal stimuli very clearly, and there existed no apparent communication between the abscess and the marginal part of the gum. The tooth was not loose. The conclusion then seemed unavoidable that this was a question of a pericemental abscess of gouty origin without demonstrable communication of the alveolo-dental articulation with the exterior.

I then examined this region with closer attention. On this side [palatal] there appeared to be no obvious lesion. The gum around the tooth appeared healthy, there was no recession, no suppuration, but what was my surprise, in passing my probe to the palatine region of the neck of the tooth to the point diametrically opposite to the seat of the abscess, to feel my probe fall into a narrow but deep pocket communicating with the threshold of the vestibular abscess along the middle third of the approximal face of the root, a communication

which I could easily establish with a fine probe.

This case was, then, contrary to all first impressions, a question of a pyorrhetic abscess analogous to those we frequently have occasion to observe, having its origin in a pocket opening to the exterior, but discharging at a point some distance from the pyorrhetic pocket.

It only remained to establish the reasons for this peculiar development of the abscess. These reasons I found in the occlusion of the teeth of my patient. His maxillary incisors completely covered those of the mandible, which latter just impinged upon the palatine mucosa, exactly at the neck of the lateral incisor and at the point where the opening of the pyorrhetic pocket was located, thereby forcing back the mucosa upon the orifice of the pocket. Because of this condition the products of infection and decomposition contained in the pocket were prevented from easy exit by its natural orifice. On the contrary, the masticatory movements forced these products more deeply into the pocket, and they sought discharge at some distant point of least resistance, *i.e.* in the vestibular region.

By establishing this fact the condition of the first patient was explicable to my satisfaction. I had been unable to recognize the true origin of that abscess because, as I remember distinctly, the patient had presented just as marked an overbite of the maxillary incisors beyond the mandibular, and the same pathogenic conditions had been present to determine those phenomena whose true origin I had failed to recognize. Since then I have had occasion to observe two other similar cases, one with my *confrère* V. E. Miégeville of Paris. Every case of pericemental abscess upon vital teeth which has come to my attention has occurred in patients presenting such an overbite.

Naturally it is impossible to prove that every case mentioned in the literature had an origin identical with that which I have just reported, but these facts will in the future necessitate great reserve before asserting the existence of an abscess of tophic origin upon a vital tooth independent of gingival infection.

I am convinced that if the practitioner be willing to institute a most minute investigation in all cases of so-called pericemental tophic abscesses upon vital teeth, he will find what I have found, and will acknowledge in principle that pericemental abscesses upon vital teeth are pyorrhetic abscesses formed in a serpiginous pocket whose cervical opening is not recognized because of its location at a point some distance from the gingival abscess.

The Pathology, Etiology, and Treatment of Pyorrhea.

By ARTHUR H. MERRITT, D.D.S., New York, N. Y.

(Read before the Academy of Stomatology of Philadelphia, April 18, 1918.)

PYORRHEA alveolaris is primarily a disease of the investing tissues of the teeth, that is, the gums, the gingiva, the alveolar process, the cementum, and the pericementum. It may be defined as a progressive resorption of the alveolar process and pericementum, with a coincident inflammation and recession of the gums and the formation of pockets around the roots of affected teeth. It begins at the gingival border and progresses slowly toward the apex of the root, resulting in the complete destruction of the alveolar process and pericementum, with eventual loss of the teeth unless arrested by treatment. Some of the phenomena attending its progress are gingival inflammation, solution of continuity in the floor of the subgingival space, absorption of the alveolar process, pocket formation, recession of gums, suppurative infection, sensitiveness to thermal shock, separation, elongation, and loosening of teeth. Of these, the first to manifest itself is gingival inflammation induced by various causes, the most common of which is uncleanliness of the mouth. A careful study of the gingiva shows it to be an extension from the gum, surrounding and closely hugging the cervical enamel, to the height of 2 or 3 millimeters. Histologically it differs from the gum tissue, being covered with a dense pavement epithelium and receiving the gingival group from the pericementum. It also differs within itself, the septal gingiva being quite unlike the labial and lingual gingiva, less dense and less resistant. Between it and the cervical enamel is a space known as the subgingival space, the floor of which is bounded by the alveolar process and cementum.

It is at this point that the first lesion in pyorrhea alveolaris occurs. Irritation of the gingiva causes inflammation, which, if long enough continued, is conveyed through the gingival group of pericemental fibers to the pericementum, eventually causing a break in the floor of the subgingival space. Coincident with the break, the cementum, pericementum, and alveolar process are exposed to the destructive forces of irritation and infection. A phenomenon known as osteoclasis is set up in the alveolar process, which is slowly resorbed. The rapidity with which this occurs will depend on several factors—the thickness of the bone, the resistance of the patient, the cleanliness or uncleanliness of the mouth, etc.

As a rule the progress is slow, often years elapsing between the initial gingival irritation and final exfoliation of the tooth. Coincident with this process, and keeping pace with it, is destruction of the pericementum. The fibers of this membrane in health attach themselves on the one side into the substance of the cementum, and crossing the space are attached to the alveolar bone. Upon the surface of the cementum and attached to it are remnants of the necrotic membrane. Covering this and extending more or less over the denuded cementum is a calculary deposit brought about through the pathological changes taking place in these tissues. The destruction of alveolar process and pericementum is followed by shrinkage and recession of the gums, though this recession never

keeps pace with the destructive process taking place in the subjacent tissues. The result is the formation of a pocket, bounded at one point by the extreme limit of bone necrosis, and at the other by the margin of the gum. Between these two points there may be and often is a pocket of considerable depth, depending upon the amount of bone loss and gum recession.

Laterally these pockets are bounded on the one side by the overlying soft tissues and on the other by the cementum with its investment of necrotic pericementum and calculary deposit. Into these pockets, even in their earliest beginnings, the bacterial flora of the mouth finds its way. These organisms are purely secondary invaders, having no direct etiological relationship to the disease. Comparative studies of the bacterial flora of these pockets show that they do not differ qualitatively from that of the normal mouth. There is, as might be expected, great quantitative difference, this being explained by the fact that these conditions are more favorable to bacterial growth and development than is the healthy mouth. This flora is a mixed infection of great complexity.

The pus-producing cocci are present in large numbers, and in every known strain. Spirochetes, fusiform bacilli, and organisms of unknown types are also present, as is the amœba. There is no evidence that any of these sustain a direct causal relationship to the disease. They do, however, give rise to one of its characteristic symptoms of pus, for without infection there would be no discharge from these pockets. It is true, there are cases in which there seems to be no pus. This does not necessarily mean that there is none. This apparent absence may be due to shallow or wide open pockets, as a result of which the pus is washed away by the oral secretions as rapidly as it is formed, or it may be due to an inactive phagocytosis, or both. That bacterial growth is less in such cases, or that it is less pernicious in its influence, seems improbable. These bacteria give rise also to metastatic infections of the gravest import, in many instances contributing to the ill health and inefficiency of the patient, and not infrequently are the indirect cause of death. About one thing there can be no doubt, namely, their potentiality for evil is an inherent quality dependent only for its exercise upon the virulence of the organisms and the resistance of the host.

This, briefly, is a picture of some of the pathological changes taking place in the investing tissues of the teeth as a result of the initiation and development of pyorrhea alveolaris—changes which, unless observed in their earliest beginnings, will eventuate in the loss of the teeth, with possible secondary infections of a serious nature.

ETIOLOGICAL FACTORS IN PYORRHEA.

For convenience sake, the etiological factors of pyorrhea may be divided into two groups, predisposing and exciting. Such a division is necessarily an arbitrary one, since it is impossible in all cases to draw an accurate line between the two, as under certain conditions a single factor may at once predispose and excite. An unsanitary mouth may be said to be an example of this kind. It is desirable, therefore, that every case presenting for treatment be carefully studied with a view to determining as accurately as possible the factors which have caused it; for no case can be intelligently treated in which there is not a clear comprehension of all the forces which have entered into its causation. It must be obvious that unless these are recognized and removed, all efforts at correcting the pathological changes which have taken place in the tissues themselves will be more or less futile.

PREDISPOSING CAUSES.

Among the more common predisposing causes may be mentioned systemic diseases, localized malnutrition, frail bony investment of the teeth, and occlusal trauma. It should be remembered, however, that it is not by any one of these conditions that pyorrhea is caused,

but by a combination of them, including those in the exciting group.

SYSTEMIC DISEASES.

Little of an exact nature is known regarding the relationship between certain diseases, such as tuberculosis, diabetes, syphilis, etc., and pyorrhea. That diseases such as these, especially in advanced stages, may so impair body resistance as to predispose to pyorrhea, there can be little doubt; that they necessarily do so, or that they express themselves in characteristic types of pyorrhea, is improbable. Even in those cases in which the defensive forces of the body are seriously impaired by the progress of the diseases mentioned, it is doubtful whether in most instances they would be sufficiently potent to actually cause pyorrhea in the absence of exciting causes. If this be true—and it seems probable—guarding against the development of localized exciting causes by increased care should be sufficient to render non-operative any possible relationship which might exist.

LOCALIZED MALNUTRITION.

Largely as a result of modern habits of life, together with the end-organ nature of the circulation in the investing tissues of the teeth, they are peculiarly susceptible to trophic changes, by which is meant a loss of nutritional balance. The use of prepared foods, entailing little or no real exercise of the organs of mastication, probably has more to do with development of disease in these tissues than has the nature of the circulation, which under normal conditions is sufficient to insure against disease. The inefficient use of the toothbrush in no small measure contributes to this condition, for as a matter of fact, it should through artificial exercise supply, in part at least, the needed stimulation in these tissues. The result is poorly nourished gums, which bleed on the slightest provocation, a fact which causes the patient to relax in his efforts at tooth-brushing, contributing thereby to the very cause which he hopes to correct.

FRAIL BONY SUPPORT.

The absence of normal exercise above referred to, together with hereditary influence, has not only resulted in poorly nourished tissues, but as might be expected under such conditions, in tissues that are subnormal in size. This will be obvious to anyone with even limited clinical experience in the treatment of these conditions, but especially impressive is it when a comparative study is made of the maxillary bones of ancient skulls with those of modern life. Such study will reveal the fact that these bones have not only undergone marked diminution in size, but in the thickness of the alveolar bone. Instead of being thick and dense at the gingival border, the alveolar bone will be found to have atrophied to a point of extreme tenuity.

This difference in thickness prevails, moreover, between individuals and between races. This is a matter of common observation, and will explain in part why it is that the incidence of pyorrhea is greater among those individuals and races with frail bony investment of their teeth. It will require no stretch of the imagination to understand why it is that teeth so supported, when subjected to adverse conditions such as prevail in poorly nourished tissues, occlusal trauma, gingival irritation, etc., more easily succumb to the destructive influence of pyorrhea than do those more favorably environed.

TRAUMATIC OCCLUSION.

Until recently few, if any, realized the relationship which exists between occlusal maladjustment of the teeth and the destructive processes which involve their supporting tissues. For a considerable time there has existed a vague notion that in some way malocclusion (using the term in the Angle sense) was an etiological factor in pyorrhea, but that pathological changes might occur in the dental investment about teeth with so-called normal occlusion, and did so frequently as a result of occlusal maladjustment, no one realized. As a matter of fact it is not a question of tooth

regularity or irregularity, but of harmony or its lack in the occlusal relations of inclined planes of opposing teeth when brought into contact. This cannot be made too plain, for it is still not clear to many that malocclusion and traumatic occlusion are quite different conditions, which may be wholly unrelated, and either may exist without the other. It is probably true, however, that other things being equal, which they rarely are, malocclusion predisposes to traumatic occlusion, and thus predisposes to pyorrhea.

Teeth may be said to be in traumatic occlusion when under the force of mastication they are driven outside of their normal limits of motion to such an extent as, under certain conditions, such as poorly nourished tissues, frail osseous support, etc., to actually induce pathological changes in the pericementum and alveolar process. There are few cases of pyorrhea in which this is not a factor to be seriously reckoned with, especially in advanced cases, where if it were not a large etiological factor, it exists as one prejudicial to recovery. Careful study of every case will be required to determine the part which abnormal motion plays in its etiology and progress. This should include observation of the occlusal relations of every tooth, number and locations of missing teeth, use of thin carbon paper, placing of the finger lightly on suspected teeth, and instructing the patient to bring the teeth into occlusion, etc.

EXCITING CAUSES.

When we come to a consideration of the exciting causes of pyorrhea we may epitomize our present knowledge by saying that anything which induces irritation of the gingiva must be regarded as a potential exciting cause, if long enough continued. The fact should never be lost sight of that pyorrhea always begins as gingival irritation, followed by solution of continuity in the floor of the subgingival space, with consequent exposure of the subjacent tissues to irritation and infection. The ease and rapidity with which this occurs will depend upon factors which have already been considered.

MOUTH HYGIENE.

One of the prolific causes of gingival irritation is uncleanliness of the oral cavity, for the laity, in spite of the oral hygiene propaganda, have not yet learned the lesson of mouth cleanliness, at least they have not learned how to achieve it. Until they have learned this, and until there is a standardized method of toothbrushing established on correct principles that is at once simple, efficient, and stimulating, there can be no hope of successfully preventing lesions of the investing tissues of the teeth, with all their disastrous sequelæ.

FAULTY APPROXIMAL CONTACT POINTS.

Another prolific cause of gingival irritation is faulty contact points. No examination of the mouth is complete which does not include a careful study of every approximal space, and no treatment will be wholly effective which does not include correction of faulty contact points when needed. With the introduction of the cast gold inlay this has been made possible to a degree before unattainable. The shell and band crowns have been, and still are, especial offenders in this class, inducing as they do in so many instances a chronic suppurative gingivitis which will continue as long as the crown remains in contact with the gingiva. Overhanging edges of fillings, especially amalgam and gutta-percha, also fall within this class. These should also be removed, and proper restorations made. Few, unless they are making a specialty of periodontia, realize how large a part faulty restorations play in gingival irritation and pyorrhea.

TREATMENT OF PYORRHEA.

In the treatment of pyorrhea an effort should always be made to determine what have been the etiological factors in the case under consideration, and as far

as possible they should be removed. Correction of occlusion, good root surgery, and the establishment and maintenance of a high order of mouth hygiene are fundamental to success in every case. Pyorrhea is a curable disease, just as tuberculosis is a curable disease, but just as patients suffering from the latter do not always recover, so patients affected with pyorrhea may not always be cured; and for the reason that in some way, which it may not be easy to explain, the conditions essential to success have not been complied with. For one thing a most exacting technique is essential. Even when this is observed complete success does not always attend one's efforts, simply because of the exceeding difficulty of meeting all the conditions. Moreover, because of a combination of circumstances which it may be difficult, if not impossible, in a given case to control, good results are not always achieved even in cases in which the prognosis seems promising.

One difficulty which attends all these cases is that to a certain extent one is dependent upon the co-operation of the patient for success. This co-operation is not always obtained, and results will be modified in consequence. The difficulty in restoring lost teeth in such a way as to prevent undue strain upon those remaining, of correcting the occlusion to insure against further trauma, and of maintaining a high order of mouth hygiene, is such that under the most favorable circumstances the results are not always all that could be desired. This being true, it is not difficult to understand why the perfunctory treatment so often given these cases is not successful, or why it is that those having failed as a result of such treatment should be pessimistic, or why they should ascribe their failures not to the inefficiency of their treatment, but to the incurable nature of the disease. Such treatment never has cured pyorrhea, and never will.

TRAUMATIC OCCLUSION.

Clinical studies of teeth in traumatic occlusion show that under the force of mastication they are constantly being driven outside their normal limits of motion. A finger placed lightly on such a tooth will readily detect this shock when the teeth are brought into occlusion. The first change, as seen roentgenographically, is a thickening of the pericementum. This disturbance will in turn, if long enough continued, be communicated to the alveolar process, and be represented by a slight rarefaction about the lateral walls of the root, and occasionally by resorption at the apical end, simulating a blind abscess, and often mistaken for such even by careful observers. All these changes may take place about a tooth in traumatic occlusion without solution of continuity at the gingival margins. Add to these conditions gingival irritation, and we have the three most important factors in pyorrhea—local malnutrition, traumatic occlusion, and gingival irritation.

Treatment consists in the correction of occlusion and the establishment of normal nutrition in the investing tissues of the teeth. The correction may be achieved in most instances by judicious grinding of the occlusal planes of all teeth in traumatic occlusion. This is best done by the use of small carborundum stones, simply grinding the contact points as shown by thin carbon paper. When this is properly done, no mutilation results, the teeth are rendered more esthetic in appearance, and the patient more comfortable. Care should be exercised, however, against indiscriminate grinding.

It should be kept clearly in mind in these cases that traumatic occlusion, local malnutrition, and gingival irritation are usually associated, and that intelligent treatment requires that each be considered in its proper relation. It is possible for the teeth to be, and one frequently sees them, in traumatic occlusion, producing no pathological changes in their investing tissues, simply because these tissues happen to be well nourished. Right here is the controlling factor, and the wise clinician is he whose efforts are directed toward building up these forces of resistance. The correc-

tion, therefore, of anything more than the more obvious faults of occlusion should wait upon treatment directed toward the correction of gingival irritation and local malnutrition. When this is done excessive grinding will not be necessary.

ROOT SURGERY.

The most important factor in the treatment of pyorrhea and the most difficult to achieve is good root surgery. This requires the removal not only of all calcareous deposits upon the exposed surface of the cementum, but the complete removal also of the necrotic pericementum, permitting thereby physiological contact between the vital cells of the cementum and the overlying soft tissues. Also the root must be left smooth, care being exercised not to plane through into the dentin. The instruments in most general use are of two types, curets and planes, both of various shapes and angles. It is a matter of indifference which type is employed, so long as the conditions essential to success are met. When this is done reattachment takes place, pockets are obliterated, new bone is deposited about the roots, the teeth become firm, and health is re-established in these tissues, though complete restoration to previous conditions may not occur; in advanced cases there will probably be gum recession.

I realize that it has been asserted and is still believed by many that "suppurative detachments of the peridental membrane are permanent detachments"; that since the cementum is a specialized tissue without independent circulatory system, it automatically becomes a dead tissue when, through suppurative infections, it loses its pericemental investment. This not true. The fact that reattachment, with all that it implies, takes place in a single instance disproves any such supposition. As a matter of fact, such reattachment takes place, *as a rule,* in the hands of the skilful periodontist. No other result is regarded by him as a cure.

The explanation of this difference of opinion is to be found in the fact that one group has met the conditions requisite to success, and the other has not. Reattachment will not take place about teeth on which poor root surgery has been practiced. This cannot be made too emphatic. Inasmuch as it is not easy to discriminate between that which is skilfully done and that which is not, it is not surprising that certain observers unfamiliar with present-day requirements should have ascribed their failures to "pus-soaked cementum," when in reality it was due to faulty technique. Reattachment can only take place through the agency of vitally active cementoblasts, which implies vital cementum. The fact that reattachment never takes place about non-vital teeth that have become septic indicates that in some way not as yet understood the pulp is the controlling factor in the vitality of the cementum. The absurdity, therefore, of destroying the pulps of teeth in the treatment of pyorrhea, as advocated by some, must be obvious.

POST-OPERATIVE TREATMENT OF PYORRHEA.

The average person, even among those who make some pretension to mouth hygiene, does not give intelligent care to his mouth, and does not keep his teeth clean. This is due to ignorance, to inadequate instruments, by which are meant toothbrushes, dentifrices, silk tape, porte-polishers, etc., and to inefficiency in their use. All this must be corrected in the post-operative treatment of pyorrhea. Most cases which present for treatment would never have occurred had proper care been observed on the part of the patient and family dentist, and unless these conditions are corrected failure is bound to follow the most skilful treatment.

The importance, therefore, of intelligent home care will be obvious. Ignorance on the part of the patient as to what constitutes such care is the first difficulty to be overcome. Unfortunately, there is no unanimity of opinion among dentists on this point. There is

no standardized method of tooth-brushing, and until there is one based on correct principles, confusion is bound to prevail. In any method, the first requisite is that it shall be simple. There are many people so lacking in manual dexterity that they will never learn a complicated system and practice it efficiently. Secondly, it must be effective; the teeth and mouth must be thoroughly cleansed. Thirdly, it must stimulate the investing tissues of the teeth. This is absolutely essential, and can only be done by a most vigorous brushing of the gums, as high up and low down as the cheeks, lips, tongue, and hard palate will permit, and lastly, it must not injure teeth or gums.

THE AUTHOR'S METHOD OF BRUSHING THE TEETH.

I shall outline for your consideration a method which I have found most satisfactory in my practice, and which is at once simple, effective, stimulating, and free from any injurious effects. The first essential is a small toothbrush of good quality, with the tufts sufficiently separated to make them flexible. Having been charged with a dentifrice, it should be placed high up on the gums in the posterior molar region, and swept rapidly up and down as far as the cheeks and lips will permit, gradually passing in this way from one molar region to the other. Not less than thirty seconds should be given to these surfaces of the teeth. The mouth should then be opened and the brush placed against the gums at the lingual surface of the last lower molar, and the motion repeated, care being observed to brush the gums vigorously. In the molar region the stroke will be more or less horizontal, becoming vertical as it approaches the median line. This procedure should in turn be repeated on the lingual surfaces of the upper teeth. The bucco-distal surface of third molars can be reached by a semicircular motion with the mouth partially closed to relax the muscles in this region. The tongue should then be extended and thoroughly brushed.

The whole operation should be repeated night and morning, and occupy not less than two minutes. After meals particles of food should be removed with waxed silk or quills, and about thirty seconds spent in brushing the teeth and gums. In any case where for some reason it is thought best, this can be often repeated. Such cases will present themselves. When this method of brushing is properly followed the mouth will be kept clean, no injury to teeth or gums will result, and the whole operation will be followed by a sense of glow in the gums, of which one will be conscious for an hour or more.

There is an impression abroad that straight up-and-down brushing will injure the gums, and that if long enough persisted in it will cause recession. The fact that this is not so may be explained by the histological arrangement in the gingivæ of the fibers from the pericementum, and by the thick pavement epithelium which covers them. Nature seems to have made provision against vertical stress, inasmuch as this is the force to which the gingivæ are constantly being subjected in mastication. The same force applied horizontally with a brush will destroy the gingival attachment, and inevitably lead to permanent recession. My own teeth, which have never been cleaned by a dentist and which have been brushed in an up-and-down direction for more than twenty years, show no abrasion or gingival irritation, and are clean. I have obtained the same results in the mouths of my patients wherever the method has been fairly tried. Its chief value lies in the fact that the method is so simple that anyone can readily learn to employ it, and most important of all, it is stimulating to the investing tissues of the teeth through the vigorous massage effect produced.

There is no feature of the post-operative treatment of pyorrhea more important than proper brushing of the teeth. This makes it necessary that patients be instructed with great care, and be fully impressed with their responsibility in the final results. They should be pro-

vided with proper brushes, their use being demonstrated in one's own mouth. Caution against too vigorous brushing at first will be necessary, lest friction on tender gums result in sore mouths. They should also be taught the use of waxed silk tape, and in some instances porte-polishers. Dentifrices of known composition should be provided for their abrasive quality; they possess no therapeutic action worthy of consideration. Mouthwashes may be used during treatment for their soothing and healing effect; their continued use is unnecessary. Dependence is to be placed upon well-nourished and highly resistant tissues, not upon mouth-washes, medicated tooth-pastes, or the thousand-and-one nostrums which are being advocated.

59 W. 46TH ST.

[See also *Discussion*, as reported under "Proceedings of Societies," this issue.]

Surgical Correction of a Double Hare-lip, Alveolar Cleft, and Cleft of Hard and Soft Palate.

By M. N. FEDERSPIEL, B.Sc., D.D.S., M.D., Milwaukee, Wis.,
PROFESSOR OF ORAL SURGERY, MARQUETTE UNIVERSITY DENTAL SCHOOL, MILWAUKEE, WIS.

THE patient, W. V. M., a male of four years, was an American born (white), weighing 34 lb. He was suffering from hare-lip and cleft palate.

History. One of twins, youngest of family of five; three older children and twin brother normal. No history of hare-lip or cleft palate among relatives on father's side; mother, however, being left an orphan in early childhood, does not remember her relatives.

The patient was strong at birth, and suffered no children's diseases excepting cholera infantum; was bottle-fed, always healthy and playful, and is now a well-developed child.

Examination. A double cleft of the upper lip extended into each nostril (see Fig. 1). A double alveolar cleft (see Fig. 2) was present, and a very marked protruding premaxillary bone holding two central incisors. (See Fig. 3.) The clefts of the alveolar process united with a medium-sized cleft of the hard and soft palate.

The mouth was fair as to cleanliness, the mucous membrane normal, and there was no visible gingivitis or pericementitis. There were occlusal cavities in the lower second deciduous molars. The tonsils were normal, and no enlarged adenoids were present.

The patient was referred to Marquette University oral surgery clinic, Trinity Hospital, April 2, 1918, and prepared to be operated upon April 4th.

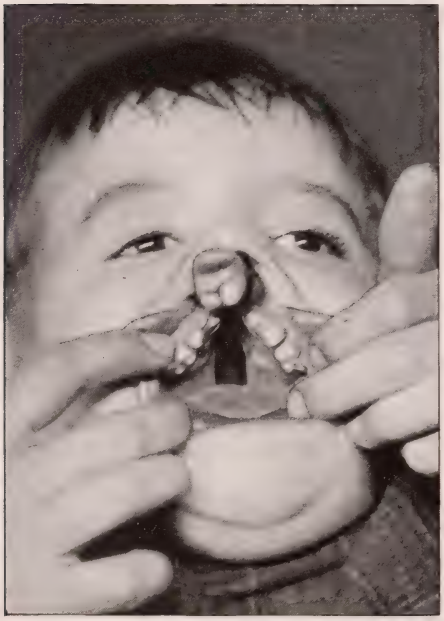
The urine and blood were normal. The patient was admitted to the operating-room at 7.45 A.M., and put under ether anesthesia. Under the anesthetic, further examination revealed that the protruding mass contained two central incisors which were tipped lingually. In this case, the lateral halves of the upper jaw were very well developed, and held the following well-developed deciduous teeth, *5432 | 2345*, the occlusion of these being in normal mesio-distal relation.

The shifting of the protruding mass distally would not permit the closing of the alveolar cleft, for the mass in itself was too narrow to complete the normal upper arch, and the anterior wall of the bone was found to be badly developed.

Fig. 1.

Showing the front view of a double harelip. The cleft on the right side cannot be seen because of the protruding os incisivum obstructing the view. See Fig. 2.

Fig. 2.



Palatal view showing the complete cleft.

The mass was ovoid in shape and stunted in growth, evidently due to the absence of lateral support and failure to functionate.

In many cases of double alveolar cleft we find that the os incisivum is usually larger than the mass here described, forming a projecting tubercle, covered by smooth mucous membrane on the inner side, with the central portion of the

Fig. 3.

Side view showing the prominence of the os incisivum attached to the tip of the nose.

upper lip attached anteriorly. In an infant it should contain the tooth buds of the temporary and permanent central incisors, arranged in pairs, one above the other. This type of oral deformity is of the most pronounced kind, yet, when operated upon at an early age (from one to three months), and the os incisivum is well developed and large enough to close the alveolar cleft, I perform a submucous resection and cut the vomer. This permits the forcing of the displaced os incisivum backward so as to form a

satisfactory alveolar arch. The bone is then held in its new position by passing

Fig. 4.

a silver wire through the vomer as illustrated in Figs. 4, 5, and 6. In this way

Fig. 6

there is no injury done to the unerupted teeth. The borders of the alveolar cleft can then be cauterized several days later in order to induce the tissues to unite in their new positions.

Fig. 5.

This, however, could not be done in this case, since the os incisivum was undeveloped, holding two centrals which were tipped lingually. Therefore, in view of the condition, Dr. A. Trigg, a prosthodontist, and I decided that it would be good surgery and far more practical to remove the protruding mass and prepare the vomer bone to act as a good base for

Fig. 7.

the artificial restoration of two central incisors. This was done under the following technique:

The muco-periosteal flap on the labial and lingual surfaces was dissected, and the mass, containing the two deciduous centrals and the tooth buds of the permanent centrals, was removed. (See Fig. 7.) The flaps of the soft tissues were

Fig. 8.

Front view showing result second day after operation, with stitches still in place.

Fig. 9.

Side view under same conditions.

Fig. 10.

Front view eight days after operation. Photographed immediately after removing stitches.

Fig. 11.

Side view under same conditions.

then brought in contact and stitched on to the lateral halves of the jawbone so as to close the anterior portion of the floor of the nose. There then remained only the cleft of the hard and soft palates. Following this operation, the double cleft of the lip was closed by bringing in contact the soft tissues which covered the protruding mass and the borders of the lip on each side. The vermilion surfaces were carefully joined, and the alæ of the nose were turned inward so as to give the boy the proper-shaped nostrils. Paraffin silk was used to suture the soft tissues. (See Figs. 8 and 9.)

The wound was kept clean by gently washing it with boric acid solution. On the eighth day the stitches were removed (see Figs. 10 and 11), and the lad was then able to functionate his lip normally.

In about six months or longer the cleft of hard and soft palates will be closed. In order to keep the space open between the lateral incisors, an orthodontic retaining wire will be fitted and adjusted so as to insure this space, which, at a later date, can be restored with a well-fitted anchor denture holding two centrals.

413 Wells Building.

The Rôle of Sepsis and of Antisepsis in Medicine.

By WILLIAM HUNTER, M.D.Edin., F.R.C.P.Lond.,

PHYSICIAN AND LECTURER ON PATHOLOGY TO THE CHARING CROSS HOSPITAL, LONDON; PHYSICIAN TO THE LONDON FEVER HOSPITAL.

(Delivered at the opening of the session of the Faculty of Medicine of McGill University, Montreal, on October 3, 1910.)*

[An introductory section of the Address dealt with the Objects of Medical Education.]

MEDICAL SEPSIS AND MEDICAL ANTISEPSIS.

AFTER these prefatory remarks regarding the objects of your present studies, I pass on to the subject which I have selected as the special theme on which I desire to address you today. That theme is the great part played by septic infection—prevalent, potent, easily observed, and accessible to treatment, nevertheless continuously overlooked and neglected—as an important cause and complication of a whole range of medical diseases. I have selected it not only because of its great practical importance to you in your medical work in after-life, but also because the story of its recognition as a great factor in causing disease illustrates in a striking way the truth of what I have just said about the importance of small things in medicine—their observation and interpretation.

For it was while seeking to throw light on the origin and meaning of a piece of blood pigment present in an organ in the first case I ever examined for curiosity's sake, that I stumbled upon the chief subject and interest of my life's work, namely, that of anemia. And it was while observing as fully as I could all the features of the first case of anemia which I ever studied clinically that I came upon the curious facts that ultimately led me to recognize the impor-

* Published originally in the *Lancet*, London, January 14, 1911.

tance of sepsis in medicine not only in producing anemia, but also many other medical affections.

I spent some five years (1885–90) in experimental and pathological work in trying to explain the meaning of that piece of pigment, and some ten years (1890–'00) in trying to explain the features presented by that one clinical case. And *then I saw,* but not till then, what I have since endeavored to describe in various papers from 1900 onward up to the present time regarding the rôle of sepsis in medicine and the importance of oral sepsis as its chief cause.

I desire now to draw your attention to the great province concerned with the action of septic infection in medicine as one deserving your attention as much as sepsis in the great domain of surgery. Like the great Northwest Territories of your own land, this province of sepsis in medicine has been with us all the time, awaiting only a fitting recognition and exploitation of its great resources. It is as yet but sparsely populated; workers and settlers in it are but few, though they have been steadily drifting into it during the last ten years, first one by one, and more recently by scores and hundreds, and already many of these have sent back encouraging and even glowing accounts of its resources. But the field is so large and the work in it is so great that its resources will not be fully exploited till the workers in it include the whole profession, prepared, if necessary, to identify themselves with it by taking the name of this great province of their work. For like many of your territories, it has remained until now without even a definite name. That name I propose now to give it, so that even if you pass it by and are not attracted by its prospects, you will at least from henceforth know what portion of the great domain of medicine is meant by it.

Time was, and I am old enough to recall it, when the greatest honor that could be paid a surgeon was to term him a brilliant operator, and to expatiate upon the rapidity with which he could carry out a particular operation. Time is, and long has been, when the title which a surgeon is proudest of is that of an "antiseptic surgeon." Possessing the knowledge, the training, and the experience that entitle him to that name, he knows that it is possible for him to become a successful surgeon, he is a worker in the field of "antiseptic surgery."

The time, in my opinion, has come—or if not already come, is fast approaching—when the title of "antiseptic physician" will become equally distinctive of a good doctor; when it will be equally honored and honorable as that of "antiseptic surgeon" now in the case of the surgeon; when the knowledge and outlook which it implies in regard to the importance of sepsis in medicine will be deemed one of the highest qualifications which a good doctor could possess; when, in short, "antiseptic medicine," the fight against sepsis in medicine, will come to have as distinct a meaning in relation to sepsis in medicine as "antiseptic surgery" has in relation to sepsis in surgery; when a knowledge of the principles and practice of "antiseptic medicine" will be deemed as essential and necessary to the physician as a knowledge of the principles and practice of antiseptic surgery is now essential to the surgeon. What these principles are it will be the purpose of this address to bring to your notice. They are deeply rooted in the knowledge and experience which it is the purpose of your present studies to give you.

PRINCIPLES OF ANTISEPTIC SURGERY.

The word "principle" which I have here employed is in common use in medicine. We speak of the principles of surgery, of medicine, of treatment, of pathology. In the sense in which it is thus employed the word means the essentialness, essential part of, important part, quintessence, pith, backbone, marrow, heart, and soul of these subjects. It includes not only the *facts,* but also some reference to the *reasoning*-grounds, way of thinking, reflection, conclusion, judgment, motive, springs of action that determine the action we take upon these facts.

If any of you, even the youngest, were asked by a layman what the "principles" of antiseptic surgery were he would probably not be able to give the whole facts and the whole chain of reasoning, observation, and experience on which the practice of antiseptic surgery is based. Even with the limited experience he possesses he would, if he were a wise student, be more likely to reply that the chief principle of antiseptic surgery is, of course, that organisms cause fever, inflammation, suppuration, etc., and hence the necessity for all the surgical precautions and the elaborate surgical ritual witnessed from day to day in surgical practice.

The motives and the grounds for antiseptic surgery are very clear and obvious, and are demonstrated daily in his surgical work. They are thrust upon his notice every moment of his surgical life; they are driven into him by the whole teaching and surroundings of his surgical work. He lives in a very atmosphere of worship of antisepsis; he conducts services at her shrine; he places offerings of clean hands and a pure antiseptic conscience and behavior on her altars. Figuratively, if not actually, he sees in flaming characters written above the doors of her holy of holies, the operation theater, the words, "Abandon Sepsis, all ye who enter here." And even if this escapes his notice, the janitor who guards the door is there to remind you, "Put on thy shoes, for the place on which thou enterest is antiseptic ground."

Is this ritual connected with surgical antisepsis overdone? Are its surroundings too ornate, its practice too ceremonial, its services too elaborate, its vestments and miters too striking? I think not, *if* the surgeon or doctor carries these antiseptic principles into practice wherever he meets with sepsis. On the contrary, they are educational to a degree. No shrine in connection with modern scientific medicine and practice appeals more to the imagination than that constituted by a modern operating theater. In no department of the whole field of modern medicine are its services to humanity so faithfully, so loyally, so scrupulously and exactly rendered as in that spot dedicated to antiseptic surgery.

What is the object of this whole elaborate ritual of observant practice? It is designed primarily for one great purpose, to prevent the access of organisms into the wounds which the surgeon has necessarily to make in the course of his surgical work. To avoid such an occurrence, such a catastrophe, as he would deem it, the surgeon takes every possible precaution that knowledge and experience suggest to him, No precaution is too minute, no duty, however trivial, appears to him as such in the attainment of his great object. He renders these services, he observes these precautions as faithfully and as strictly in the case of the outcast admitted from the poorest slum as he would to the highest personage in the land.

In the early days of antiseptic surgery the ritual was different, for the principles underlying it were also different. It was at first sight thought that organisms of any kind might produce the untoward results which the surgeon feared—hence the first observances of antiseptic surgery, the use of spraying during the operation and the elaborate and repeated dressings necessitated during the subsequent healing of the wound.

It is now known that the organisms which the surgeon has most to fear are not those in the air, but those present (staphylococci and streptococci) on the patient's skin, or on his own fingers, or on the instruments which he employs. His procedure is therefore now directed primarily, not against the organisms of the air, although precautions against these are involved in the arrangements he makes for the ventilation of his operating theater; nor yet primarily against the introduction of organisms from the walls and floors, although that source is also scrupulously kept in view in the plans he accepts for his floors and ceilings and walls, and in the ritual he observes in his work.

The full force of his precautions is directed against the introduction of septic organisms into his wound conveyed by his own fingers or those of his assis-

tants, or by his instruments. If he has an untoward result where he confidently expected a successful one, if fever occurs or his wound suppurates without obvious cause, his suspicions, if he is a good surgeon, would probably fall first upon his own fingers, secondly upon those of his assistants, thirdly upon his instruments, and fourthly, or lastly, upon the air in the theater. It he were a bad surgeon the order of suspicion would be reversed.

You will note that the whole procedure of the antiseptic surgeon is directed against the introduction of organisms into the body as the result of his own operation, or at least against their conveyance from places where they are already present—*e.g.* the intestine—into cavities such as the peritoneum, where their effects might be serious or fatal. His responsibility, in short, so far as preventing the access of organisms into the body, begins and ends there. If they gain access through his wounds, through the failure of any precautions on his part, he is responsible, and no one feels this responsibility more than he does. If, however, the organisms are already in the body, as they frequently are in abscesses and suppurations connected with the bones, joints, stomach, intestines, liver, kidney, and other organs which he is called on to relieve by operation, he is only responsible for seeing that, so far as he can help, the organisms shall not be conveyed by his procedure into adjacent parts. He is not—he considers—responsible for their original access to the parts where they are causing trouble. That is a *medical* or *pathological* matter with which he is not primarily concerned, and with which he cannot deal. And yet unknown to him, and unnoted by him, he may be allowing his patient to retain a degree of sepsis (in the mouth) which would receive his immediate attention were it found anywhere else. (See Cases 1–6, *infra.*)

SEPSIS IN MEDICINE.

I have dwelt upon this point, the extreme ritualistic regard which the surgeon shows toward sepsis in surgery, for I wish to contrast it with the attitude of the medical profession toward the same (staphylococcal and streptococcal) sepsis in medicine—*i.e.* in medical diseases.

That attitude is a very curious one, as will presently appear. If a doctor were asked what it was, he would probably say that it differed in no way from that shown toward it in surgery. He was as keen to discover and remove sepsis and its various suppurative and necrotic effects in the domain of medicine—*e.g.* in connection with the throat, pharynx, stomach, duodenum, gall-bladder, liver, cecum, appendix, colon, or rectum, pelvis of kidney, the brain, the pleura and the lungs, the glands, etc.; or failing the presence of actual pus he was as keen and observant about the presence or absence of streptococci in the blood in cases of obscure blood poisonings, septicemias, ulcerative endocarditis, etc., as the surgeon was in the surgical domain. He could even point out that so much was this the case that these various regions of the body had been largely divided up among specialists, who devoted the greater part of their time to dealing with the various affections of these parts, among these affections septic infection being one of the commonest and most important. In short, his attitude toward sepsis in medicine, he would maintain, was precisely the same observant one as he was taught to show toward it in surgery. The only difference between the two cases, he might point out, was the unfortunate one that the sepsis he found in medicine was not so easily got at or so easily removable as it happily was in the domain of external surgery. But, as we saw, the regard which the surgeon shows toward sepsis in the domain of surgery is not confined to its removal when present. It has another and far greater object, namely, its prevention. It is not so much in the removal as in the prevention of sepsis that surgical antisepsis has won its great triumphs.

APPARENT RÔLE.

If the doctor were asked how the matter stood with regard to the *prevention*

of medical sepsis, he would probably say that that was a matter he unfortunately could not control. These septic suppurations unfortunately occurred in medicine as complications of various medical diseases; in fact, they were often the essential features of these diseases, or actually constituted them—perforations, appendicitis, empyema, liver abscess, cholecystitis, glandular abscesses, septicemia, ulcerative endocarditis, etc. The occurrence of these grave septic conditions, whether local or general, depended upon the state of health of the parts affected or of the body as a whole; and the factors concerned in giving rise to them were therefore as many and as various as the many and various local or general factors affecting the health of the particular organ, or of the body as a whole. Staphylococcal and streptococcal organisms were always in the body, *e.g.* in the intestinal canal. It was unfortunately impossible to prevent them getting access now and again into other organs or into the blood. In any case, however common the above-named septic conditions might be, they were, after all, rare in comparison with the medical diseases with which he had to deal, of which they were only occasional complications or sequelæ. When they did occur they were matters for the surgeon, not for him. He found sufficient scope for his own work among the more purely medical complaints and illnessses of his patients, the various conditions of general ill-health presented by his patients—*i.e.* the malnutrition, the tonsillitic, naso-pharyngeal, and glandular troubles of younger children; the dyspepsias, indigestions, gastric and duodenal ulcers, intestinal catarrhs and ulcerations, and liver disturbances of his older patients; their subacute and chronic rheumatic troubles; the simpler anemias of young girls, which usually yielded easily to treatment, although they, too, sometimes were curiously resistant to treatment; the much more severe and troublesome anemias of the middle and older periods of life; the multitude of their nervous complaints; their fevers of known nature (influenza or scarlet fever, diphtheria, typhoid, measles, etc.), and their complications; still more, the fevers of unknown or obscure nature which they occasionally suffered from, and which were so troublesome both in diagnosis and in treatment.

These and other affections of a like kind were numerous and troublesome enough to occupy all his time and call for all his powers of diagnosis and all his skill in treatment by appropriate medicinal and dietetic measures. They took in the medical sphere the place and importance that sepsis and its prevention took in the surgical.

Complications of a septic nature sometimes occurred in connection with some of them. These called for the help of the surgeon. To the surgeon septic infection was an all-important factor of disease. The doctor, worried to death with the multitudinous complaints of his patients and the apparently multitudinous and obscure causes underlying them, might often feel envious—if he cared to be so—of the surgeon's easier task in having to deal so much and so successfully with the removal or prevention of one well-defined infection, septic infection. If only he were able to prevent the causes of his patient's troubles as quickly and as effectively as the surgeon prevents or gets rid of sepsis, his work in medicine, he might well say, would be a simpler and more interesting work both to his patients and to himself than it now is. Alas, however, from the point of view of prevention the medical diseases with which he had to deal arose from many causes connected with the habits of life and surroundings of the patients, difficult to ascertain, and when ascertained not so easily preventable or removable as the great factor of septic infection in surgery.

Sepsis in surgery, its action, prevention, or removal, was the greatest "principle" of pathology and practice with which the surgeon had to deal. Sepsis in medicine was a causal factor of altogether subsidiary importance; it was only one of many others. Even when it was present it was in most cases, if not in all, only a complication of other

diseases, not its primary cause. It was an accident, a "terminal complication" of some other and more important disease.

ACTUAL RÔLE.

Now, it is with this whole conception of the sphere of activity and importance of sepsis in medicine that my whole work for many years joins issue. What I wish to say to you today is that the above conclusions regarding its importance do not in my experience represent even approximately the actual pathological and clinical facts of the case.

In my clinical experience septic infection is without exception the most prevalent infection operating in medicine, and a most important and prevalent cause and complication of many medical diseases. Its ill effects are widespread, and extend to all systems of the body. The relations between these effects and the sepsis that causes them are constantly overlooked, because the existence of the sepsis is itself overlooked. For the chief seat of that sepsis is the mouth, and the sepsis itself, when noted, is erroneously regarded as the resultant of various conditions of ill health with which it is associated—not, as it really is, an important cause or complication.

The causal connection between the two sets of processes—the sepsis and its ill effects—can be demonstrated by the simple expedient of removing the sepsis and noting the striking effect which the removal has upon the existence, character, and intensity of the ill effects. The ill effects referred to include in individual cases every one of the diseases described in the foregoing section, and regarded as essentially medical in their character, viz, the general ill health, dirty, sallow complexion, the indigestions, the gastric and intestinal troubles, the anemias which resist treatment, the tonsillitic, pharyngeal, and glandular troubles of children, the chronic rheumatisms, obscure fevers and blood poisonings, etc.

The effects are not the same in all cases, any more than are the effects of septic infection in surgery or those of tuberculous infection in medicine. They affect sometimes one system and sometimes another, in different degrees according to the individual susceptibility, just as a chronic tuberculous infection may in one case affect the glands of the neck, in another the joints, in another the bone, in another the lung, in another the meninges, in another the peritoneum, while in another it may affect them all.

So with this septic infection in medicine, the effects fall sometimes more on the tonsils, pharynx, or glands of the neck; sometimes more on the stomach, intestine, and colon; sometimes more on the blood, causing anemia, purpuras, chronic septicemia, obscure fever; sometimes more on the joints, causing so-called rheumatic trouble; sometimes more on the nervous system, or on the kidneys, and sometimes it falls in a fulminating way upon the blood as a whole, causing a general infection with streptococci with or without infective endocarditis.

The sum-total of ill effects which it produces—of the ill health and the incapacity occasioned by its presence—is very great. It is greater in my observation than that produced by any other single factor in medicine, or by any other single infection operating in general medicine.

Sepsis in medicine therefore ranks, in my experience, as the most prevalent and potent infective disease in the body. It therefore deserves the particular attention of the whole profession as much as it has hitherto received their particular neglect. It requires this attention at the hands of every branch of the profession. But it concerns especially the medical profession, the doctor whom the patient first consults. The responsibility for first detecting its existence, or realizing its significance as a potential cause or complication of the patient's disease, or of applying the first measures of treatment, all devolve upon him. It is his opinion and interpretation that will determine the degree of importance which the patient will attach to his condition. If he belittles what he sees, or, what is even more common, if he fails to observe

by close examination what lies before his eyes, the patient will not receive the advice or treatment he needs, and he will not allow others to give it to him.

"ORAL SEPSIS."

In the foregoing sketch of the chief spheres of the doctor's work and interest I omitted any reference to one other portion of the body which constantly comes under his observation, indeed, more often than any other; I mean the mouth. This omission was intentional on my part. The cases presently to be described, which could be multiplied by thousands and tens of thousands coming under the daily notice of doctors, illustrate how constant this omission is in practice.

There is no part of the body more commonly looked into by the doctor than the mouth. He looks at the tongue of every patient he sees, and learns much from its condition. It is notoriously a very unruly member, in more ways than one. It constantly "gives away" its owner in the ordinary affairs of his life, and it does the same in the matter of his diseases, for it yields the doctor most instructive and important information regarding the bodily health—the condition of digestion and the general health.

When looking into the mouths of his patients the doctor has often occasion to note incidentally the presence of defective or decayed teeth, as a general accompaniment and apparently as a part result of the poor health, poor nutrition, or wasting diseases from which they suffer. These defects of the teeth are so common that he has ceased to worry about them. He has often asked his patients how they can expect their digestion to be good. What else but indigestion can they expect if they will not have their teeth "put in order" by the dentist, or get the dentist to supply new ones? How can they expect to masticate their food properly with such defective teeth? But, as he may sorrowfully add, patients are "hopeless" in this matter; they will not "attend to" their teeth; not only so, they are also actually "touchy" on the subject. The patient is quite willing to describe and discuss with the doctor all his other troubles and complaints, to which, as he says, he is a "martyr"—his indigestions, headaches, liver troubles, his rheumatism, his gout, and his "neuritis." But the subject of his teeth is his own affair, one between himself and his dentist. And the doctor regards it as such. "It is a matter of teeth and dentistry," with which he cannot deal.

What I desire to impress upon you students, and all students entering the profession, and all those already engaged in the practice of the profession, is, that it is "not a matter of teeth and dentistry." It is an all-important matter of sepsis and antisepsis that concerns every branch of the medical profession, and concerns very closely the public health of the community. It is not a simple matter of "neglect of the teeth" by the patient, as is so commonly stated, but one of neglect of a great infection by the profession, a great infective disease for which the patient is not primarily responsible any more than he is responsible for the contraction of typhoid fever or tuberculosis. The condition referred to is that to which I have given the name of "oral sepsis."

The title oral sepsis was first introduced into medical literature in a paper entitled "Oral Sepsis as a Cause of Disease."* My object in seeking for a special name, and, after consideration, in creating this one, was to emphasize the great fact that it is not the absence of teeth but the presence of sepsis, that it is not dental defects but septic effects, that it is not defective mastication but the effective sepsis associated with such dental defects or often present in conditions of gingivitis apart from such defects that are responsible for the ill health associated with "bad" mouths.

The second object was to emphasize the importance of the infection caused by staphylococcal and streptococcal organisms, as distinguished from the purely saprophytic infections in which the mouth abounds; or the temporary

* *British Medical Journal*, July 1900.

presence of specific organisms, *e.g.* typhoid, tubercle, pneumonia, etc.

The subject of oral sepsis, as I designated and defined it, namely, the septic lesions of streptococcal and staphylococcal infection found in the mouth, belongs to no one department of medicine or surgery. It is common ground on which the general doctor, physician, or surgeon, the throat-nose-and-ear and the eye specialist, specialists in children's diseases, in stomach diseases, in blood diseases, in "rheumatic" diseases, in fevers, in skin diseases, in nervous and mental diseases, and lastly, the dental surgeon, all meet on terms of equal responsibility. In its earliest manifestations no special knowledge is required to deal with it; a sound grasp of the principles underlying antisepsis alone is required. Unfortunately for the patient, it is precisely this grasp which I grieve to say is wanting.

One would think poorly of a surgeon or doctor who declined to take the responsibility of treating a follicular (that is, a "septic") tonsillitis, but insisted on handing over the case to a throat specialist, or who allowed a patient to suck continuously a number of septic sores on his finger. I think no less poorly of any doctor or surgeon who declines to make himself responsible for the treatment of much of the oral sepsis presented by many of his cases—for this is what patients are constantly doing. Wherein consists the pathological difference between a follicular tonsillitis and a foul, septic suppurating condition of the gums, with deposition of calcareous "crusts and scabs" (so-called tartar), covering and hiding septic wounds and ulcers, loaded, as microscopic examination shows, with staphylococci and streptococci. None whatever, except that the latter is exceedingly common and the tonsillitis is comparatively rare. The pathological condition in both is the same, namely, sepsis. Moreover, it is a sepsis as easily recognized and much of it as easily removed in the case of the one as in that of the other, and the more urgently requiring to be removed, since it is more important as a potential disease factor than any other source of sepsis in the body.

But, it is urged, the condition is so common that it is impossible either to prevent it or to deal with it successfully; further, the ill effects are few and rare compared with the wide prevalence of the condition. As I originally showed (1900), and my further experience of the last ten years, supported by that of many others, fully demonstrates, the ill effects are both common and grave; that they are not more common is due solely to the great resisting power possessed by the mucosa of the mouth and gums.

This matter of oral sepsis is, therefore, of urgent importance in relation to the whole multifarious and widespread group of affections—medical, surgical, and dental—caused by the actual presence or toxic action of pyogenic organisms (staphylococci and streptococci).

My clinical experience satisfies me that if oral sepsis (and naso-pharyngeal) could be successfully excluded, the other channels by which "medical sepsis" gains entrance into the body might almost be ignored. Sepsis as an important and prevalent cause of disease in medicine would almost cease to exist, instead of being, as in my judgment it is at the present time, a more important and prevalent cause of disease in the domain of medicine than it is in that of surgery. Time was when the positions were reversed, when sepsis was so prevalent in the surgical wards that it overflowed into the medical wards in the form of some of its effects—for example, amyloid disease of the kidney and liver and intestine. Now the relations are otherwise. In the form of the various affections above mentioned the greatest variety and most severe manifestations of sepsis and its effects are, in my experience, to be found in medical wards, whence they overflow (in the form of appendicular, gall-bladder, pleuritic, pyelitic inflammations and suppurations) into the surgical wards.

It is, of course, impossible to keep staphylococci and streptococci out of the mouth, just as it is impossible to prevent

occasional access of diphtheria, typhoid, pneumococcus, tubercle, and other infections. But that fact does not deter us from taking the most extensive sanitary and hygienic precautions to keep typhoid or tubercle infection out of the water or milk we drink or the air we breathe. I am satisfied that by suitable measures this far greater evil of oral sepsis could be largely prevented.

I submit, then, once more—as I did in the first communications (1900) and later papers (1903) bearing the title of "Oral Sepsis"—that in the interests of the many sufferers from the great group of medical affections which it produces, this condition of oral sepsis, the chief channel of access of all pyogenic affections, is urgently deserving of increased notice and attention. Knowing as we do the pathogenic qualities of staphylococci and streptococci, we have not the slightest excuse for allowing the mouth, so easily accessible to local measures, to remain the chief seat of its open wounds and a veritable hotbed for their development and propagation; on the contrary, it is a severe reflection on our profession if we allow it.

Even if the teeth were not subject to a very marked septic infective process, that which we term caries and carionecrosis, and always remained intact except in so far as they were affected by the septic infection in the gums and in the periosteum of the sockets, the infective processes in the gums constitute very important septic wounds, and are a great source of sepsis to the body. As a matter of experience this is often the case. The teeth remain intact or at least free from obvious caries or carionecrosis, but the gums and periosteum of the sockets are the seat of numerous septic wounds. These effects are shown by septic suppuration, by deposit of tartar, sometimes in great masses, on the teeth, on the gum margin, and beneath the gum margin, by the formation of pockets (septic ulceration of periodontium—periosteitis), absorption of bone, and loosening of the teeth in their sockets.

All these conditions are very obvious to the doctor if looked for and observed, and they are very septic and productive of some of the worst septic effects on the bodily health. But in many cases they need not be so obvious, for the septic infection may be confined almost exclusively to the periodontium (periosteum) of the sockets, and be evidenced only by ulceration of that membrane, pocket formation, loosening of the teeth, suppuration; sometimes, however, by very slight suppuration.

It is in poor patients that these septic conditions are most common. They have had "no care" of their mouths; their fate is the relatively happier one of having their septic roots lying exposed in all their nakedness surrounded with tartar, overgrown it may be by foul, septic, fungating gums. This sepsis is relatively open and above-board; it stares one in the face when it is looked for. At the worst it is covered by plates—which they have been told not to remove (!)—covering septic roots—which they have been told to keep (!) in order to prevent any falling-in of the gums. The conditions in these cases, atrociously septic as they are, are comparatively easily dealt with, for they can be seen and recognized, and even if the patient refuses to have his roots removed, much of the sepsis is superficial, and can be got at and removed by careful daily swabbing with antiseptic lotions. And if this can be done regularly the patient may ultimately be induced to have the septic root removed.

But the problem presented by similar conditions in private patients is a much more difficult one. One of the worst cases of sepsis I have ever seen was brought me by a doctor who told me that the mouth had been "carefully seen to and was in good order." The patient was a tall, handsome man in the prime of life, a case of severest Addisonian so-called "pernicious," idiopathic anemia. His mouth was, indeed, clean to all outside appearance, for it was one mass of gold caps, bridges, crowns, fillings, false teeth, etc., so ingeniously built up that one could hardly tell what was false and what was real. To free that man from

his sepsis in his state of health involved what was really equivalent to a major operation in surgery. The conditions of sepsis, necrosis, etc., revealed on removal of this golden architecture were perfectly appalling.

No one has probably had more reason than I have had to admire the sheer ingenuity and mechanical skill constantly displayed by the dental surgeon. And no one has had more reason to appreciate the ghastly tragedies of oral sepsis which his misplaced ingenuity so often carries in its train. Gold fillings, gold caps, gold bridges, gold crowns, fixed dentures, built in, on, and around diseased teeth, form a veritable mausoleum of gold over a mass of sepsis to which there is no parallel in the whole realm of medicine or surgery. The whole constitutes a perfect gold trap of sepsis of which the patient is proud, and which no persuasion will induce him to part with; for has it not cost him much money, and has he not been proud to have his black roots elegantly covered with beaten gold, although no ingenuity in the world can incorporate the gold edge of the cap or crown with the underlying surfaces of the root beneath the edges of the gums? There is no rank of society free from the fatal effects on health of this surgical malpractice.

I speak from experience. The worst cases of anemia, gastritis, colitis of all kinds and degrees, of obscure fever of unknown origin, of purpura, of nervous disturbances of all kinds ranging from mental depression up to actual lesions of the cord, of chronic rheumatic affections, of kidney disease, are those which owe their origin to, or are gravely complicated by, the oral sepsis produced in private patients by these gold traps of sepsis. Time and again I have traced the very first onset of the whole trouble of which they complained to a period within a month or two of their insertion. The sepsis hereby produced is particularly severe and hurtful in its effects, for it is dammed-up in the bone and in the periosteum, and cannot be gotten rid of by any antiseptic measures which the patient or the doctor can carry out. Moreover, it is painless, and its septic effects therefore go on steadily accumulating in intensity without drawing attention to their seat of origin.

Such are the fruits of this baneful so-called "conservative dentistry." The title would be a fitting one if the teeth were a series of ivory pegs planted in stone sockets. But the teeth being what they are, namely, highly developed pieces of bone tissue, possessing, I would point out, a richer blood- and nerve-supply than any piece of tissue of the same size in the whole body, and planted in sockets of bone with the closest vascular relations to the bone and the soft tissues of the periosteum and the gums, the title that would best describe the dentistry here referred to would be that of "septic dentistry." Conservative it is, but only in one sense. It conserves the sepsis which it produces by the gold work it places over and around the teeth, by the satisfaction which it gives the patient, by the pride which the dentist responsible for it feels in his "high-class American" work, and by his inability or unwillingness to recognize the septic effects which it produces.

After ten years' experience of the nature of these effects and of the difficulties encountered in removing them, I feel that the only solution of the difficulty may best be described in the terms employed by Huxley, modified to suit this particular case:

> There can be no doubt that the future of oral pathology and treatment, and therefore of practical dentistry, depends upon the extent to which those who occupy themselves with these subjects are trained in the principles and impregnated with the fundamental truths of oral sepsis and oral antisepsis.

The problem is an important one for the dental profession, and its solution is an important one in the interests of public health, especially of our school children, thirty to fifty per cent. of whom suffer from dental and oral sepsis and its tonsillitic, pharyngeal, glandular, and other effects. For while a large body of that profession are engaged in dealing successfully with the difficult

problems of dental disease and of oral sepsis, another body is no less steadily engaged in promoting sepsis of the worst character and degree by ignoring the fundamental truths connected with the anatomy, physiology, and pathology of the tissues with which they deal. To gold-cap a healthy or a diseased tooth in order to beautify or "preserve" (!) it is the negation of every one of these truths—a veritable apotheosis of septic surgery, and of surgical and medical malpractice.

The medical ill effects of this septic surgery are to be seen every day in those who are the victims of this gilded dentistry—in their dirty-gray, sallow, pale, waxlike complexions, and in the chronic dyspepsias, intestinal disorders, ill health, anemias, and nervous ("neurotic") complaints from which they suffer. In no class of patients and in no country are these, in my observation, more common than among Americans and in America, the original home of this class of work.

CLINICAL EFFECTS OF SEPSIS.

The chief feature of this particular oral sepsis is that the whole of it is swallowed or absorbed into the lymphatics and blood. Unlike the sepsis of open wounds on the outside of the body, none of it is got rid of by free discharge on the surface. The effects of it, therefore, fall in the first place upon the whole of the alimentary tract from the tonsils downward. These effects include every degree and variety of tonsillitis and pharyngitis, of gastric trouble from functional dyspepsia up to gastritis and gastric ulcer, and every degree and variety of enteritis and colitis, and troubles in adjacent parts—*e.g.* appendicitis. The effects fall in the second place upon the glands (adenitis), on the blood (septic anemia, purpura, fever, septicemia), on the joints (arthritis), on the kidneys (nephritis), and on the nervous system.

I cannot within the time at my disposal bring before you all the facts relating to medical sepsis or to its greatest cause—oral sepsis—on which these conclusions as to their importance are based. This I have done in the series of papers already referred to. I propose rather to deal with you as you dealt with your assumed inquirer in the matter of antiseptic surgery, namely, enunciate briefly certain definite principles that may appeal to you, and illustrate these by a few recent cases selected at random.

The first of these principles is that the sepsis here had in view is all swallowed or absorbed, and that infection with staphylococcal and streptococcal organisms carries with it certain definite and deleterious effects wherever it is found. These effects vary, naturally, with the site of the infection and the degree of resistance offered by the tissues which are the seat of the invasion.

In the case of the mouth the mere presence of staphylococci and streptococci on the surface of the mucosa, or on the tongue, or in the mouth secretions, or in the saprophytic flora which abounds in the mouth, does not of itself cause disease, any more than their presence on the uninjured skin. But the matter is totally different when they become seated in open wounds in the edges of the gums adjacent to carious teeth; or extend from this, their first site, downward along the periosteum (periodontal membrane) of the tooth socket. The infection is then no longer a superficial one, it is in connection with the soft tissues, periosteum, and bone. The resistance of these tissues, especially the gums, is fortunately very great, hence a degree of infection which anywhere else in the body would certainly draw attention to itself by its redness, swelling, heat, and pain, may indeed cause redness and swelling, but does not necessarily cause any pain. This is the more to be regretted in that a feature of septic infection in the gums, the teeth, or the sockets of the teeth, is that it is infection in contact with diseased bone, and its virulence is intensely aggravated by this fact. For no septic infection is more intensely virulent than that connected with diseased bone. I speak from personal experience on this point. The

only two occasions in which I ran a very close risk—in one instance of my life, in the other of a limb or my life—were two in which in my postmortem work I contracted a blood poisoning from pus arising in connection with diseased bone. One of these was of a case of "septic anemia," in which I pricked my finger while handling the tongue from a mouth full of oral sepsis. The symptoms showed themselves in twelve hours, and were ushered in by faintness and rigors, fever of 103° to 104°, and cellulitis of the whole arm before any local disturbance had shown itself.

Such untoward effects in the case of infection of the gums or jaws are very rare, although I have seen complete gangrenous necrosis of the whole of the alveolus and the bone of the hard palate, pyemia, and death to result from this infection. But although such fulminating effects are exceptional, septic effects of various kinds and degrees are invariably present. These effects are not proportionate to the mere amount of the existing sepsis, but depend on its virulence. The most intense anemia, blood poisoning, hectic fever, and even ulcerative endocarditis may in my experience be produced by one septic amalgam filling, or by a small deep-seated alveolar abscess, or an unrecognized suppuration of the antrum or nasal sinuses. On the other hand, a man may have the foulest sepsis for years without apparently any ill effect. But he need not vaunt himself unduly upon this comparative immunity; sooner or later his sepsis will find him out (see case 10). For even if it does not itself produce definite disease of its own, it will certainly complicate any independent disease from which he may afterward suffer, and its effects, although unrecognized, may really constitute some of the most prominent features of his disease (cases 7, 8, 9, and 10).

A patient's illness is not necessarily made up of the effects of his chief disease. The degree of ill health or of the gastric, intestinal, febrile, anemic, and nervous disturbances from which he suffers are by no means necessarily connected with, and due to, his chief disease. The chief interest of clinical as distinguished from systemic medicine, lies in the recognition of this great fact—in, so to speak, dissecting out all the causal factors operating in any individual case, and in removing so far as possible every adventitious factor, even if the chief one, *e.g.* permanent organic disease, is beyond control.

CASES.

CASE 1. *Septic gastritis.* A patient, a man, age thirty-two, was admitted suffering from chronic indigestion and gastric trouble. His habits had been regular, his bodily physique was good. There was no apparent reason why he of all men should be subject to gastric trouble. On examination I found he had a tooth-plate in his upper jaw which he had not removed for two and a half years (having been told not to do so), and which, even now, he could only remove with difficulty and after persuasion. On its removal there was found the most intense septic inflammation and ulceration of the gums around a number of necrosed roots underneath the plate. This was immediately dressed by me. After careful antiseptic dressing for several days to get rid of some of the septic infection, with immediate and obvious benefit to the patient, he ultimately consented to have the roots removed, and the patient left the hospital in a week or two entirely free from all gastric trouble. The condition was septic gastritis produced by an intense oral sepsis, due to the insensate action of a dentist in supplying and fixing a plate to be worn over necrosed roots.

Nine-tenths of the cases of dysepsia and gastric trouble which I see are caused or complicated by similar oral sepsis, and respond at once to removal of this sepsis. Nevertheless the sepsis is overlooked because not looked for.

CASE 2. *Septic gastritis.* I was shown recently a very severe and obscure case of gastritis in a woman of thirty-three. She presented a dirty gray complexion and a broken-down appearance. The fullest report of her case was read to me, including the results of a chemical and microscopical examination of her stomach contents and of her feces. On examination she presented the most intense oral sepsis, ulceration of

the gums, with large deposits of tartar covering the ulcers and extending up to, and inclosing, the teeth, many of these being quite loose in their sockets. She had swallowed this infection for years, and it had caused not only "septic" gastritis, but also septic colitis, for, as was duly noted, pus was present in the feces.

Everything in connection with the case had been duly observed and recorded, including the presence of pus in the feces. But the condition of the mouth, although noted to be bad, had not been dealt with.

CASE 3. "*Septic colitis.*" A patient was admitted suffering from chronic colitis of many years' standing; he had been an inpatient of other hospitals for the same complaint. He passed large masses of mucus with each motion. The case was so-called "mucous colitis," a title which seems to mean something definite, but merely means that he has some kind of colitis, and that he is passing mucus. On examination I found he had some twenty rotten roots in his mouth, all of them necrosed down to the level of the gum. The infection had all been swallowed for many years. I termed the condition septic colitis. The teeth were carefully dressed for several days and then extracted. Three or four days later the patient ceased to pass any more clumps of mucus in his stools, the bowels became regular, and in two or three weeks' time he went out free from all intestinal trouble. The condition was one of septic colitis caused by oral sepsis.

Even if the colitis had been originally due to some other cause—*e.g.* dysentery, typhoid—it would have been intensely aggravated and complicated by this additional septic infection. I have seen many similar cases, and the connection between oral sepsis and colitis is by no means sufficiently recognized.

CASE 4. *Septic anemia.* A patient had suffered from anemia for six or seven years. Five or six years ago the anemia was so marked that she was warned by a distinguished surgeon who saw her that it might become "pernicious." When seen by me (1907) she was leading an invalid's life, suffering from chronic anemia, weakness, giddiness, and palpitation, going about from place to place in search of health. Her history was the following: For the last twelve years she had had pains, very acute, of a neuralgic character over the right frontal region, and this was followed by a discharge of pus from the nose, followed by a similar attack the following winter. From time to time there was tenderness over the right frontal region with increase of discharge. She was sent to me by a well-known nose specialist with the following note: "She has a chronic, foul empyema of the right frontal sinus, and there is muco-pus in the corresponding antrum. Whether these conditions cause the anemia I do not know; they do not help its getting better. My suggestion is that she should let you relieve her anemia as far as possible, and when she is well enough she might have the sinus dealt with." My own opinion was quite definite. The whole history and the degree of the blood change—viz, 50 per cent. of hemoglobin—satisfied me that the anemia was "septic anemia," and that it owed its origin to the suppuration of the frontal sinus. I therefore recommended that this latter should be dealt with at once. This was done, and the patient left the home in a few weeks' time entirely cured of her ill health and anemia, from which she had suffered for six or seven years.

CASE 5. *Septic anemia.* A patient, age sixty-four, sent to me on September 8th for severe anemia, from which he had suffered since February. Red corpuscles 41 per cent., hemoglobin 40 per cent., leucocytes 5000. No history of loss of blood. I suspected septic anemia and looked for possible causes. I found he had only five teeth markedly septic (oral sepsis 3°), with two small necrosed roots buried in the gum of the right upper alveolus, the gum margin and alveolus being much thickened. The right cheek was somewhat swollen and puffy, with some pain in the left side and tenderness of the last molar. On inquiry I learnt that at the beginning of the illness he had an aching tooth, and went to a dentist who supplied him with a set of plates ill-fitting and uncomfortable, which had to be rejected; then supplied another set which also had to be rejected. (The dentist, it will be seen, failed to recognize the actual septic trouble presented by the remaining teeth.) The patient was placed in a home on September 14th. On transillumination no antrum disease was discovered. I had the five teeth extracted with difficulty, owing to chronic osteitis. On September 20th the corpuscles and hemoglobin had risen to 49 and 58 per cent. respectively, and the patient left the home on September 25th looking well, with 75 per cent. of corpuscles and 75 per cent. of hemoglobin. By October 18th he had 84 per cent. of hemo-

globin, and on November 17th he had 91 per cent. of corpuscles and 94 per cent. of hemoglobin, and was looking in good health.

CASE 6. *Septic anemia.* A man was admitted into a surgical ward on account of gastric symptoms with some hematemesis, suggestive of cancer. On examination nothing surgical was found justifying operation, but his anemia was most profound, and he was transferred to my medical ward. On examination I considered the degree of anemia to be too great to be accounted for by any loss of blood there had been, and there was marked fever. I therefore examined him for other causes. The gums were very pale and clean, and the teeth good with the exception of one upper bicuspid. Even on inspection I drew the attention of my class to its importance as a possible seat of hidden sepsis. On examining it a teaspoonful of pus burst from it. On further examination by transillumination the antrum above showed a deep shadow. The necrosed root was extracted and the antrum opened up and found full of the most offensively smelling pus. Between the time when he was first examined by me and the operation the pus discharged from the socket of the necrosed tooth was about two or three teaspoonfuls daily. He had swallowed and absorbed this daily—probably for many months, possibly years—with resulting gastritis and anemia, and he was transferred from the surgical to the medical ward because his condition was essentially a medical one, not a surgical one (!). The condition was one of oral medical sepsis, unlooked for, unrecognized, due to the sepsis produced by one septic root, which had probably "never given him any trouble."

CASE 7. *Septic anemia as a complication of phthisis.* A man suffering from advanced phthisis looked so exceptionally pale and anemic that had he had no phthisical signs in the lung he might well have been considered a case of anemia. His pallor and anemia, however, were not connected with his phthisis, but with the extremest degree of oral sepsis which he also presented. His health greatly improved when the condition had been dealt with. His anemia was largely the anemia which I have termed septic anemia.

CASE 8. *Septic anemia as a complication of chronic nephritis.* A patient suffering from chronic nephritis may, and often does, present an extremely anemic appearance, and in many cases a very severe degree of anemia may be present in the blood. But that also is not necessarily a result of his nephritis, but may be, and often is, due to co-existing oral sepsis, sometimes of an extreme degree. So far from his anemia being the result of his nephritis, the nephritis may be, and, in my experience and judgment often is, largely a concurrent effect of the sepsis causing his anemia.

CASE 9. *Septic anemia complicating gastric ulcer and chlorosis.* A girl is admitted suffering from the symptoms of gastric ulcer, and she may, and often does, present an extremely anemic appearance. In her case the anemia is promptly designated chlorosis, but it is not necessarily wholly of that character. For she may, and frequently does, present an extreme degree of oral sepsis. This sepsis is, in my observation, largely the cause not only of her anemia but also of the gastric ulcer. Her trouble is by no means only gastric ulcer; both the gastric ulceration and her anemia have originally been caused by the overlooked sepsis of her mouth. They are really septic in their nature, and if the temperature of cases of gastric ulcer be watched it will be found that a certain amount of fever is very often present. And a still more interesting practical result may be noted—viz, that on removal of the oral sepsis the three conditions of gastric trouble, anemia, and fever clear up together.

CASE 10. *As a complication of nephritis.* A patient suffered from chronic Bright's disease, and presented all the usual symptoms and features of that condition—urinary changes, vascular changes, eye changes, edema, headache, drowsiness, etc., including also a varying degree of fever. The temperature suddenly rose, and erysipelatous cellulitis of one side of the face appeared. The condition thus appeared clinically as one of chronic Bright's disease, complicated by erysipelas. On examination a deep ulcer with much stomatitis was found on the buccal mucous membrane of the affected cheek. The condition then appeared clinically to be kidney disease complicated by erysipelas and ulcerative stomatitis. On further examination the ulcer of the mouth was found to be directly in contact with an intensely septic molar root, and many other teeth showed marked septic gingivitis, with tartar deposit and pockets (septic periodontitis). These latter septic lesions had obviously been there for years. The ulcerative stomatitis and the erysipelas were not sequelæ of chronic kidney disease, but the direct manifestations of an entirely different disease—viz, septic infection which had probably existed for many

years. The irregular fever presented by the case was also septic. We had thus two intercurrent conditions—kidney disease and sepsis. The latter is euphemistically termed a "terminal" infection, meaning thereby that it has come on toward the end of the patient's chief disease. But this infection was not "terminal," was not determined by the kidney disease. It had existed for many years prior possibly to the nephritis, and the continuous excretion during these years of its toxins was quite capable of producing a chronic tubular nephritis; or, failing that, was certainly aggravating any nephritis due to other causes.

AS A COMPLICATION OF SPECIFIC FEVERS.

The following cases show to what extent oral sepsis complicates specific fevers, such as scarlet fever, typhoid, diphtheria, and the striking benefits to be got from its removal.

In 648 cases of scarlet fever admitted into the London Fever Hospital under my care in the four years 1904–07, the incidence of oral sepsis, carefully noted by myself, varied from 25 per cent. to 43 per cent. The effect of oral antisepsis—the removal as far as possible, immediately on admission, of every trace of oral sepsis around the patients' teeth and gums by daily swabbings with 1:40 carbolic acid solution—throughout the earlier part of the disease was very striking. The chief complications of the disease were reduced as follows: The incidence of secondary adenitis was reduced from 9.6 per cent. in 1904 to 3.3 per cent. in 1906, and 1.8 in 1907; of cellulitis of the neck from 5.2 per cent. in 1904 to 2.8 in 1906, and *nil* in 1907; of glandular suppuration from 1.7 per cent. in 1904 to 0.5 in 1906, and *nil* in 1907. The striking improvement was due to the increasing care taken by myself and by my residents and nurses under my instructions. In only one or two cases out of the whole series were any teeth extracted.

PRINCIPLES OF TREATMENT.

What are the general principles of the treatment applicable to medical sepsis? The first and most important is curiosity about and careful observation of the actual character and degree of the septic foci present in the mouth (nasopharynx or elsewhere) in every case of medical disease. This cannot be made by a cursory glance into the mouth, and a general conclusion to the effect that the "teeth are fairly good," or the mouth "fairly clean," or that the mouth "requires to be seen to." If you look closely into the mouths of your patients and note what you see you will observe every degree and variety of septic gingivitis, every degree and variety of septic ulceration, every degree of tartar deposit as a great effect of this septic inflammation and ulceration, every degree of suppurative inflammation of the gums, every degree and effect of septic periosteitis and periodontitis with formation of pockets and loosening of teeth, every degree and effect of septic osteitis—*e.g.* rarefying osteitis, causing recession of the bone socket, or formative osteitis, causing thickening of alveolus; every degree and variety of septic caries and necrosis of the teeth; and as a result of all these conditions, singly or combined, every degree and variety of septic stomatitis, simple, ulcerative, gangrenous. You will see all this in infinitely less time than it takes to examine a specimen of the gastric contents, or of the feces, or of the urine, or of the sputum; in far less time and with far less labor than it will take you to examine the nose, or the nasopharynx, or the larynx; in far less time than it takes you to examine the heart, or the liver, or indeed, any other organ of the body. In particular cases you will observe that all these septic conditions are produced, or intensely aggravated, by tooth-plates covering necrosed roots, by amalgam and gold fillings which have become septic, by porcelain crowns with gold collars, by gold caps over diseased teeth, gold bridges and other gold fixed dentures which, however good to begin with, are never really aseptic, and are liable to become extremely septic. All these you can observe in a few minutes if you look for them—in less time, almost, than it takes to mention them.

The prime indication in treatment is thus to recognize the septic infective nature of these mouth lesions and their true relations to each other—to recognize which are the causes and which are the effects.

As I have shown, the course of the septic infection is from the gums to the periodontium (periosteum) of the root, and thence to the bone of the socket. The results are septic gingivitis with ulceration, septic periodontitis (periosteitis) with ulceration (pocket formation), rarefying osteitis of the tooth itself, or of the socket with loosening of the tooth. As a result and accompaniment of the whole of these processes, we have the formation and deposition of tartar in larger or smaller amounts on the edges of the gums, in the pockets, or on the tooth itself. The prime causal factor in all these processes is the septic infection; all the other processes—gingivitis, periodontitis and periosteitis, osteitis, and tartar deposits—are the results of this septic inflammation and ulceration.

I am accustomed to ascertain the degree of oral sepsis present in every case by close examination of the condition of the gum and bone around each tooth, and to indicate the degree of sepsis—whether slight, moderate, or severe—by the figures 1°, 2°, 3° respectively. In many cases these figures do not suffice, for the degree of sepsis is so great that it can only be expressed by figures up to 7° or 10°. The patient may have all his teeth good, excepting one or two, and yet these may present such a degree of septic gingivitis, or ulceration, tartar deposit, or necrosis, or there may be so much tartar deposit in connection with one or more or all of his teeth, that the degree of sepsis is really severe—3°, 5°, or 7°. Or he may present a veritable mausoleum of gold work in his mouth in, on, and around his teeth, and be regarded as having his mouth "well cared for" and "thoroughly set in order," when, as a matter of fact, the degree of sepsis and necrosis covered and hidden by the gold is perfectly appalling (10°). I speak from experience. I have had many such cases, and they are the most trying and pitiable cases with which one has to deal, for they are produced by dentists. The worst cases of septic gastritis, enteritis, and colitis, of ill health, anemia, obscure septic fever, and other manifestations of medical sepsis, are in my experience those in which the greatest so-called "care," the greatest amount of "American skill" in the shape of gold work, has been bestowed on the mouth. For the patient refuses to have it touched; he has paid much for it, and has been told by his dentist that it represents the highest dental skill. As one of them put it to me, "For the life of him he could not see what connection it had with his condition"!—in his case, one of continuous ill health, gastric and intestinal trouble, and finally of anemia, from which he had suffered for twenty years. His death shortly afterward "saw" the connection.

In observing the degree of sepsis in my hospital cases I am in the habit of dressing the septic wounds. The method I employ is to swab the edges of the gums and teeth with cotton and 1:60 carbolic in order to clean off pus, and to enable me to see the character and extent of the underlying wounds. The wounds are thereby dressed at the same time that they are being examined, and all the superficial sepsis is gotten rid of. This antiseptic dressing of the gums should be carried out daily so long as open wounds are present, by the nurse or by the patient himself; and it is astonishing how quickly the septic conditions of the gums are improved thereby, and how quickly the patient feels and shows by his appearance the benefit of this antisepsis.

Both the observation of the lesions and the treatment here described can be carried out in almost as short a time as they can be described. Pus is removed, pieces—sometimes masses—of soft tartar can be tilted off the edges of the gums, the foul, bleeding wounds lying underneath them are exposed, and simultaneously dressed. This treatment is applied irrespective of the presence or absence of deeper-seated sepsis—such as that connected with carious or necrosed

teeth. For even if such are present, as they so often are, the removal of the superficial sepsis is a great boon to the patient, since if left it would be swallowed. Moreover, if the teeth have to be removed, the preliminary dressing frees the wounds around the necrosed teeth from much of their sepsis, and thus prevents the risks of further infection of the fresh wounds created by the removal of the tooth.

A further and by no means the least important advantage of the simple antiseptic measures here described is this: The patient himself learns for the first time that care of the teeth does not necessarily mean extraction of teeth; that, short of extraction, much can be done without any discomfort or pain to himself; moreover, that he himself can in many cases carry out the necessary antiseptic measures. Weak, nervous, highly-strung patients, who at first absolutely refuse to allow anything to be done to their mouths, will, after a short experience of antiseptic dressing, of its freedom from pain, and of the benefits they experience from it, consent without demur to the removal of their carious roots. In one such case under my care, admitted very ill with a long-continued fever of unknown nature, the patient ultimately consented to have ten or twelve necrosed roots removed, and went out quite well—a marvel to herself and to the doctor who sent her in, thinking that she had some obscure malignant or tuberculous disease. The temperature, which had ranged between 101° and 103° for many weeks, fell to normal on the day after the removal of the septic roots.

These are very simple principles of treatment for a condition that carries with it so many ill effects—so it may be said. Yes, the principles are simple—they are *only* (!) those of observation and recognition and removal of the sepsis responsible for these effects. They are of the same simple character as those underlying the washings and scrubbings of his own hands and the skin of the patient which the surgeon carries out with such patience and ritualistic care. They have the same object—namely, the removal or prevention of any sepsis that can possibly introduce septic infection into the body. Like these measures, they are most effective when carried out by the doctor himself, not left to others. They differ from the antiseptic measures of the surgeon in one respect; they are not carried out amid the same impressive antiseptic surroundings. They therefore lack the impressiveness of the surgeon's antiseptic precautions both for the patient and the medical onlooker. But this is a fault that can, and will, I hope, in the near future, be remedied. For the evil of sepsis in the mouth is a very prevalent one and can never be adequately dealt with by driving every sufferer from it through the already overtaxed and overburdened hospitals of the dental profession. Even after it is dealt with antiseptically in the manner above described by the doctors and surgeons whose cases it complicates, there will always remain sufficient for the dental surgeon to undertake in his own sphere.

The surroundings which I would fain see provided in both general and dental hospitals and children's schools for carrying out these initial and all-important antiseptic dressings of the mouth would be special dressing-rooms free from all costly appliances of dental chairs and dental apparatus, and furnished simply with the simpler antiseptic furniture of a surgical dressing-room. If patients could learn that they could have their gums and teeth antiseptically dressed by a competent nurse without any pain or discomfort to themselves, the evil of oral sepsis could be greatly prevented or kept in check. For they would learn from this experience what they cannot learn now—namely, the antiseptic objects and the benefits of cleanliness of the mouth. As one hospital patient put it, "No one had ever told me before."

These principles of treatment are indeed simple; they are only those underlying the whole practice of antiseptic surgery—namely, removal of sepsis whenever it is causing ill effects and can

be got at. If they can be put into practice in the domain of medicine to prevent or get rid of some of the most prevalent diseases in medicine, as it is my experience they can be, it is the duty of the medical profession as a whole and each member of it within his degree to help to carry them into practice, and to devise the proper measures in their hospitals to enable them to be carried out.

The evil is so common and widespread that it is impossible to deal adequately with it—so it may be said. The same plea might have been urged in connection with every other great practical advance in preventive medicine—*e.g.* the sanitary measures for the prevention of typhoid and other water-borne diseases. To deal effectively with such diseases, to teach people how to be clean in their sanitary arrangements, must have appeared an almost hopeless task when sanitary science was first put into practice. But everything can be done in time, if the principles underlying our efforts are sound.

So with this great evil of oral sepsis and its manifold ill effects, far more widespread in their extent and no less severe in their character than those connected with typhoid or even with tuberculosis. The plea of helplessness to deal with it, I submit now, as I did in my first papers on the subject, is a singularly poor one to be put forward or given any support by the medical or surgical profession, at whose instigation the most elaborate and expensive equipments of hospitals have been and are daily being carried out.

Improved Method of Casting Splints and Use of Headgear in Treating Fractured Jaws.

By JAS. EDWARD AIGUIER, Ph.G., D.D.S., First Lieut. D.R.C., U. S. A., Philadelphia, Pa.,

INSTRUCTOR EVANS DENTAL INSTITUTE, UNIVERSITY OF PENNSYLVANIA.

DENTAL surgeons of today, especially those connected with the army, are paying considerable attention to the treatment of jaw injuries.

Having been associated with the teaching staff of the Officers School of Oral and Plastic Surgery, at the Evans Institute (Univ. Pa.), established by the Surgeon-general of the United States Army for the training of surgeons and dentists, this experience being supplemented by the twenty-odd jaw cases which came under my observation in the oral surgery clinic during the past winter, the great necessity for simplifying the method of treating jaw injuries was forcefully brought to my attention. In the treatment of fractured jaws one soon realizes that a universal splint can never be devised, as each accident case is a law unto itself, and only after careful diagnosis can the proper splint for the particular case in hand be decided upon.

However, there are many instances in which the basic principles of a universal method of making splints can be applied. Time is the all-important factor in making splints, especially in the present war work. It is well known among surgeons who have done considerable work with fractured jaws that a splint should be applied within twenty-four hours, for after fibrous union begins it is difficult, and the longer the delay the more difficult, to get absolute reduction of the fracture; in some cases it is impossible without surgical interference. Simplicity is another important factor; the simpler

the method for making these devices the greater the benefit it will be to the patient. Not only in war work, but in general practice the dental surgeon is inclined to resort to the method that requires the least time and the least amount of work; for in general practice, in the usual fractured jaw case the patient is unable to pay an adequate fee for the service.

The swaged metal splint has undoubtedly proved most satisfactory and met with most favor in the treatment of war cases, according to the articles written on this subject, and in general practice the same is true. However, the swaged splint necessitates the making of dies and counter-dies and the tedious process of swaging and soldering, in which there is always the possible chance of not getting the proper articulation.

With these ideas in mind the writer has devised a method of casting splints which he has put to practical use for several months on a number of cases, and has proved its worth in the matter of saving both time and expense, and in its general usefulness.

Cast splints are by no means new. Port in 1890* and 1905 described a cast splint of the Gunning type made of tin, also Hauptmeyer† in 1908 described a method of using cast splints of tin in connection with the headgear. Cole and Bubb (*British Medical Journal,* 1916) used the cast interdental and Gunning splint of aluminum.

A cast splint made of a metal which in general has proved to be well borne in the mouth, a metal that will melt at a low temperature, and one that will cast without pressure or suction, thus eliminating the use of a casting machine, would seem to be particularly desirable for war work.

Tin has much in its favor, for the following reasons: During the last sixty years, tin, alone or alloyed with some other metal, has been used for cast lower dentures. During this period thousands of these dentures have been made and worn, and up to the present date there is but a single case of "tin poisoning" reported.

The report of this case appears in the *Journal of the American Medical Association* (April 6, 1918, p. 980) and is looked upon by authorities as a case of individual idiosyncrasy, which may have resulted from the use of impure tin, or the alloying may have caused the formation of other compounds. According to the report of the case, the metal showed evidence of corrosion in spots, which would lead one to suspect impurity. In consulting works on toxicology there is no report of poisoning from pure tin, but a few cases of poisoning are reported from *tin salts,* which of course are soluble.

The National Canners' Association research laboratories, Washington, D. C., make the following report on the toxicity of tin: "It is well known that the earlier workers on tin poisoning were altogether wrong, and that the toxicity of tin is very slight, if indeed it can be demonstrated."

I have consulted several toxicologists on the subject, and they are all of the opinion that pure tin will *not* cause poisoning.

The low fusing-point of tin (232° C., 450° F.) is another important feature in its favor. This fusing-point is sufficiently low for the metal to be melted over any kind of a fire, and consequently a special furnace or blowpipe is not necessary. By experience we find that tin can be cast without pressure, giving the finest details, and thus eliminating the necessity of a casting apparatus.

EXAMINATION AND HANDLING THE PATIENT.

The surgeon or dentist should first examine the field of injury very carefully to determine the amount of damage and to locate the line of fracture, after which impressions of the jaws are taken in soft plaster. The best material for this work

* Port, "Dental Schiene aus Zinn," *Aerztl. Intelligenzblatt,* No. 9, 1890.

† Hauptmeyer, "Ueber erfolgreiche Verwendung von Kieferschienenverbände bei Frakturen und Resektionen mit besonderer Berücksichtigung der Zinnscharnierschiene," Leipzig, 1908.

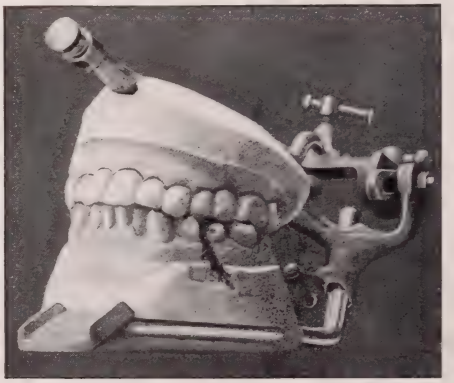
is known as "Byrtis" plaster, as it can be very readily separated from the model by dropping in boiling water, thus saving considerable time. Before taking the impressions the teeth surfaces are coated with vaselin. The impression of the *uninjured* jaw is taken first, as this causes very little discomfort to the patient. Then the impression of the injured one, which is more painful, is taken, using very soft plaster and applying it to the surfaces of the teeth with the finger or spatula before inserting the tray filled with the soft plaster. Cutting and trimming of the trays are sometimes required, and often it is necessary to make trays of modeling compound to fit the individual case, and sometimes to take the impressions in sections. The use of vaselin also facilitates the separation of the plaster after the tray has been removed. Radiographs are now made; they are *absolutely essential* in treating these cases. In the meantime the models are poured, and, the patient having now returned, all infected roots present are removed and the teeth are scaled if necessary. Any tooth in the line of the fracture, and teeth with fractured roots, must be removed. The mouth is cleansed with potassium permanganate solution (1:5000) and Talbot's solution of iodin is applied to any lacerations or badly inflamed areas. Next the fracture is reduced and the teeth wired until the splint is ready. The jaws are held in place by the aid of the headgear devised by the writer and described below, with its rubber-dam chin support. Instructions are given regarding the diet, which must be confined to liquids taken by the aid of a tube. The mouth must be rinsed thoroughly with normal saline solution every hour or two, and especially after meals.

TECHNIQUE OF MAKING THE SPLINT.

First saw through the model of the injured jaw (Fig. 1) in the line of fracture, and articulate the teeth to those of the other model, waxing the pieces of the cut model together in proper relation. With the aid of the face-bow set the models on the articulator (Fig. 2), using the Gysi, Twentieth Century, or any type of articulator to which the face-bow can be adapted. Each cast is now covered with two layers of tin foil (No. 60), burnishing each layer separately and perfectly to place, where they are held by sticky-wax. The surface of the foil is then oiled, and a sheet of Kerr's casting wax No. 24 ($3\frac{1}{2}$ by $3\frac{1}{2}$ in.) is adapted to the teeth over the foil.

Fig. 1.

Fig. 2.



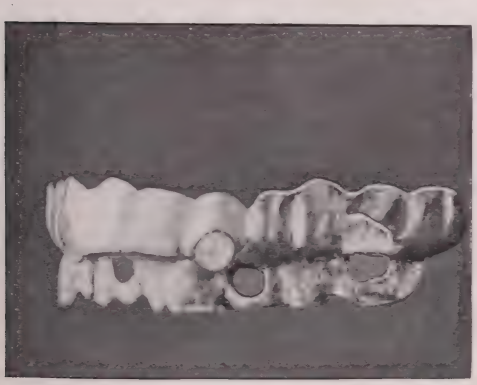
The wax is chilled from time to time with cold water while trimming it on the upper and lower teeth to the gingival margins. Do not allow the wax to extend beyond the margins, as this will in-

jure the soft tissues, and do not trim the wax short of this line, as a certain amount of strength will be lost. The

Fig. 3.

occluding surfaces are slightly heated over a flame, bringing them together with sufficient pressure to get absolute con-

Fig. 4.



tact. (Fig. 3.) Windows are cut in the wax to show that the teeth are in proper occlusion when the splint is cemented to place. The best locations for these windows are over the labial surfaces of the central incisors, premolars, and molars of both upper and lower jaws (Fig. 4), being sure to have a window on *each side* of the line of fracture. This is very essential in order to assure the operator of the absolute reduction of the fracture when cementing the splint. The space on the lingual surface between the upper and lower wax forms must be filled with wax to make a smooth, self-cleansing surface; this also adds strength to the splint.

The waxed piece is again chilled with cold water, the splint form removed, and a core with three sprues added (Fig. 3), one sprue attached to the symphysis and one to each heel. The core is made as large as possible, to obtain weight of metal, using a sheet of base-plate wax and making a cylinder. It is not necessary to make this a solid core, as the cylinder is more easily removed and saves considerable wax. The core can be made of a metal tube slightly covered with melted wax or oiled to facilitate removal; this would save time where any great amount of splint work was being done. Note that casting wax is used for the splint form, but base-plate wax is used for the core and sprues. The method of using two cores, one at each heel as an inlet and outlet, has not proved very satisfactory in our work, for the reason that in order to get detail the cores have to be made so long as to require considerable more investment and therefore more time to dry out.

Cover the entire wax splint forms with silex and casting plaster in the proportions of 3 parts of silex to 1 of plaster, painting it over all surfaces with a small camel's-hair brush. (Fig. 5.) The waxed model is now placed in a casting flask. (In an emergency a casting flask may be made with a tin can cut and bent to the dimensions of about 1½ by 3½ by 3½ in.) The investment is now completed with sand and casting plaster in the proportions of 1:2. The investment is allowed to harden for one hour or more, the flask put over a low fire, the heat being gradually increased until all the wax is burned out. Allow the flask to cool so that the hand can be held near it without discom-

fort. Moderately hot melted block-tin is poured into the investment, relying on the weight of the metal, provided for by the large core, to give a proper cast. The casting is allowed to cool thoroughly before removing, and never chilled with cold water, as this may have a tendency to destroy some of the details of the casting.

After the removal of the casting the sprues are cut off with a frame saw or

Fig. 5.

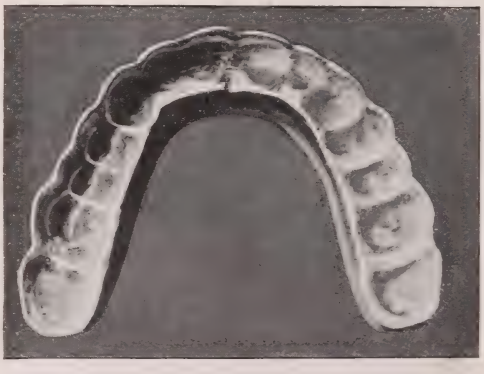
other suitable instrument (Fig. 6), any rough edges on the splint are trimmed with a plug-finishing bur or vulcanite file, using pumice and brush wheel for the final polish. The splint is tried on the model, first removing the tin foil, to be sure of its perfect adaptation. Sometimes while investing the wax form it loses its proper shape, as the wax is very thin and easily distorted. If this should occur, the pliability of the metal will readily permit its correction by simple thumb pressure. This is another important point in favor of tin. The splint is now ready for use. (Fig. 7.)

The above-described splint is applicable to cases in which there has been very little or no loss of bone and there are few or no teeth missing. In mouths in which

Fig. 6.

many teeth have been lost, accompanied by the loss of bone substance, it is advisable to bridge the spaces with nickel-silver wire (gage No. 13), using one or two strands on the labial and lingual sur-

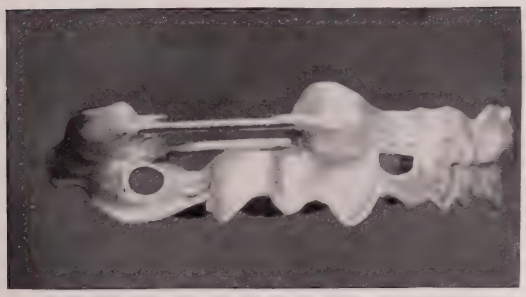
Fig. 7.



faces according to the strength needed. (Fig. 8.) Wax these wires into place, and in order to have the casting adhere to them they must be previously tinned. The tinning is accomplished in the following manner: The wire is dipped in a saturated solution of zinc chlorid, then

wrapped with a single layer of tin foil No. 4. The wire is then held over a flame until the foil fuses, which it does at a very low temperature; it is then re-

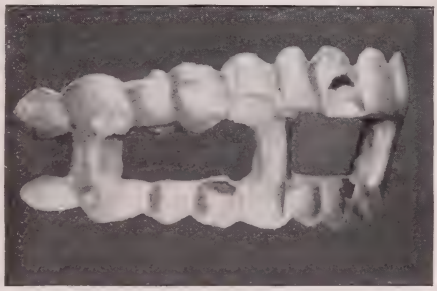
Fig. 8.



moved and brushed with a toothbrush or rubbed with a cloth. Another method of tinning is to slightly heat the wire, apply zinc chlorid and dip in melted tin, after which the wire is rubbed with a cloth.

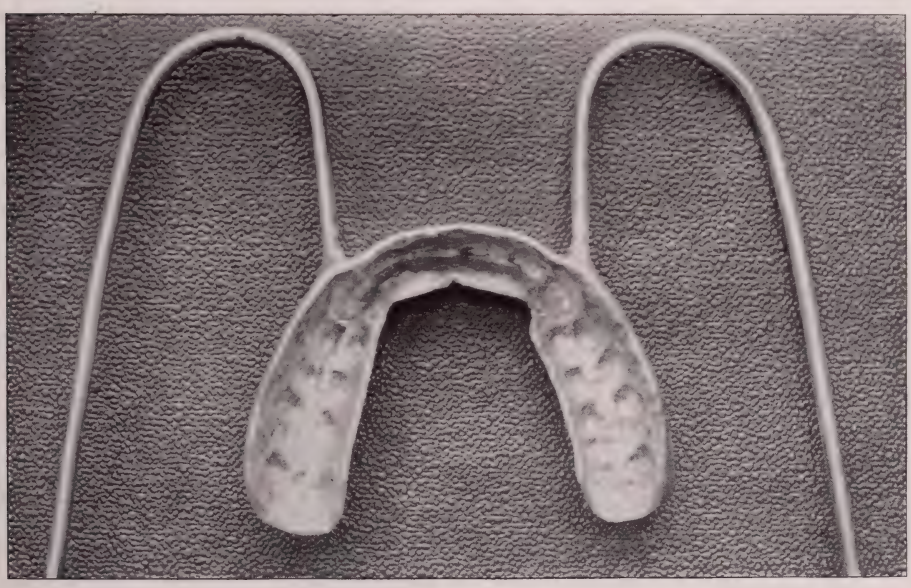
If it is desired to make individual splints for the upper and lower jaws with lugs for wiring the two together, these lugs are soldered to the wire, tinned as above described, and then waxed to place. Likewise if the case requires an open bite for feeding or for cleansing the mouth,

Fig. 9.



pillars of suitable size to give strength can be waxed at suitable places. Fig. 9 illustrates a modified Gunning splint, with better adaptation, less bulk and weight, more slightly and easier to keep clean.

Fig. 10.



The Kingsley splint can be cast of tin (Fig. 10), instead of using vulcanite, thereby saving considerable time and pro-

ducing a splint with practically no difference in weight from the vulcanite splint. There is also in its favor the fact that the cast splint is more accurate than the vulcanite.

CEMENTING THE SPLINT.

Before applying the splint the patient is given a hypodermic injection of a quarter of a grain of morphin sulfate and $\frac{1}{120}$ grain of atropin sulfate to relieve the pain and check the flow of saliva. The splint is tried in the mouth, reducing the fracture carefully, and noting by the windows in the splint that the teeth are in proper occlusion. The splint is then removed, the mouth sponged dry, and gauze placed in the vestibule and vault of the mouth to take up any secretions. The teeth are wiped with alcohol and dried with an air-blast, and the splints wiped with alcohol and dried.

The cement is mixed very thin, but in quantity, a copious amount being applied to both sides of the splint; the gauze packing is taken out and the splint quickly placed into position, again noting the occlusion by means of the windows. The jaws are held together with considerable pressure for from fifteen to twenty minutes. In the meantime grease the lips well with vaselin or cold cream, to prevent injury to the dry tissues. If this precaution is not taken, herpes will sometimes develop. The excess of cement is now trimmed away, and the headgear, with rubber dam for additional support, applied as in Fig. 11.

For fractures with no great loss of bone substance, splints are allowed to remain in place for from five to seven weeks, but where there is any great loss of bone substance they must be retained for a much longer period.

TECHNIQUE FOR THE REMOVAL OF SPLINTS.

To remove splints, cut through the metal with a wheel bur, using one the thickness of the metal, cutting from the occlusal to the gingival edge along the median line of each tooth surface, or, tin being a soft metal, a knife or chisel can be used; bend back the metal, and remove the splint. After the removal of the splint the teeth should be scaled and polished, and the gum margins touched with Talbot's iodin solution.

NECESSITY FOR HEADGEARS.

The use of head appliances for maintaining fixation of the jaws dates back to the time of Hippocrates, and during the middle ages Celsus, Galen, and Avicenna used chin supports for fractured jaws. Ambroise Paré used and described these devices in the middle of the sixteenth century. Piperno writes of one used by Solda in the middle of the eighteenth century,

Within the past fifty years headgears have come into prominence in treating fractured jaws, and the following men have contributed special forms: Bean, Bouisson, Cravoisier, Graefe, Hamilton, Kingsley, Schroder, and others. However, none of these were universal, nor would they answer the present demand in war surgery. Blair, in his latest edition of "Surgery and Diseases of the Mouth and Jaws," describes a headgear used by Kazanjian during the present war, made of webbing and vulcanite.

The numerous reports of war cases have shown the necessity for a headgear that could be used universally for all face and jaw wounds, one that could be adjusted to any head and that would not only act as a chin or splint support, but answer many other purposes, *i.e.* as support for pressure pads in plastic operations, support for pressure pads to arrest hemorrhage, also as a support for nose-plugs and to hold saliva aprons, etc., but most important of all, to save bandage material, as the average head bandage requires from five to ten yards for each dressing.

With these ideas in mind the writer has devised a headgear which has been used with success during the past winter in the oral surgery clinic of the University of Pennsylvania. This appliance is inexpensive, being made of non-elastic webbing $1\frac{3}{8}$ in. wide, nickeled

brass buckles, zinked steel bands and nickeled steel hooks and eyelets which are covered with celluloid (Fig. 11), and is adjustable in three dimensions so that it will fit any size or shape of head. The horizontal band has a zinked steel band attached with hooks at stated intervals on the anterior half, and a buckle for the adjustment of the band. The longitudinal band runs forward from the occiput and buckles at the median line of the forehead. The transverse

Fig. 11.

band runs over the vertex so that the stirrups do not interfere with the ears, with a buckle for its ready adjustment.

The zinked steel on the horizontal band gives the apparatus the rigidity which is desired in so many cases. The stirrups of heavy wire are made adjustable and will fit any pair of hooks on the band, bringing the point of support to any desired position. Rubber dam, elastic webbing, or bandage may be fastened to the stirrup and passed under the chin for support.

This apparatus can be washed, sterilized, and used again if desired.

The Surgeon-general's Office of the United States Army has approved and adopted this headgear for the division of "head and jaw surgery."

As a definite method of procedure let us consider the following cases:

Patient H. C., age thirty-nine, on April 3, 1918, while repairing the top of an elevator, dropped with the machine five stories to the basement. He was found unconscious, with a lacerated scalp and concussion of the brain, a fractured arm, and many injuries of the body. He also received a bilateral fracture of the mandible between the first and second premolars on the left side, and through the body of the ramus on the right side, allowing

Fig. 12.

the segment of the jaw to drop about one inch. (Fig. 12.)

The patient was attended by a surgeon and lay in a critical condition in the hospital for several days. Every attention was given the patient's injuries *except* the fractured jaw, as the surgeon had had very little experience with this class of cases. Radiographs of the jaw were taken, and the patient's family were informed that the jaw would never resume its normal articulation. Three days later the attending surgeon called a dental surgeon into consultation, who found the patient's general condition improved; he had recovered from the shock, but the jaw was in a very bad condition. On examination the bilateral fracture was very soon determined; severe infection with swelling and temperature was also present. After cleansing the oral cavity with potassium permanganate solution, plaster impressions were

taken and casts made, and the jaws radiographed to verify the previous examinations.

A hypodermic injection of morphin sulfate grain ¼ was given to relieve the pain when reducing the fracture. The teeth were scaled, the mouth again cleansed with permanganate solution, and Talbot's iodin was applied, after which the fracture was reduced, with considerable difficulty owing to the adhesions.

Fig. 13.

(It is to be noted that any delay in placing fractured bones in *correct apposition* is a matter of very serious import to the patient, the surgeon, and the dental surgeon, for the reason that in some cases it is impossible to get absolute reduction without surgical interference, and this may lead to infection and many pathologic sequelæ of a serious nature.) When reduction was completed the teeth were wired and additional support was applied by means of the headgear with rubber chin support described above.

The following day the second premolar in the line of fracture was extracted, the mouth cleansed in detail as in the previous description, and a splint constructed by the method mentioned was cemented to place. During the night the patient developed violent paroxysms of coughing, due to an acute laryngitis, which caused the splint to loosen. In the morning the splint was removed, cleansed and re-cemented. Codein sulfate was ordered, grain ¼ every three hours as needed, to allay the cough. As an additional support for the splint, the headgear with rubber dam beneath the chin was kept on continuously. The mouth was rinsed thoroughly once a day with the permanganate solution, and with normal saline solution every hour. The infected and inflamed areas were dried and touched once a day with dilute Talbot's iodin solution.

At the end of six weeks the splint was taken off, as the patient had recovered, and it was found that the jaws were occluding naturally. (Fig. 13.)

The writer is greatly indebted to Mr. J. T. Cologne of the graduating class of the University of Pennsylvania School of Dentistry, who has so willingly helped in the preparation of specimens, and to Messrs. A. E. and F. P. Croke for taking the photographs used in this article.

40TH AND SPRUCE STS.

Correspondence

Radiolucency of Chloro-percha in the Radiograph.

To the Editor of the Dental Cosmos:

Sir,—The findings upon this subject, as published by Dr. Clyde Davis in your May issue, are not in accord with the results obtained by experiments made upon the same subject by myself, and as possibly he, and not I, may be at fault, the results obtained by me are here given.

It must be appreciated that every day hundreds, if not thousands, of roots of teeth are skiagraphed, and the question of correctly interpreting these pictures is of the greatest moment.

A central incisor root was sawed down vertically through its center for about a quarter of an inch, beginning at the apex, when the saw blade was deflected, and a piece of the root was removed. (Fig. 1.)

A *thin film* of chloro-percha was placed in the root-canal, the loose piece of root put back in position; the tooth was now set in a socket in a mandible which was at hand, and a skiagraph taken. The result is shown in Fig. 2.

The root was again opened, the canal *well packed with chloro-percha,* and the same details again repeated. The result is shown in Fig. 3.

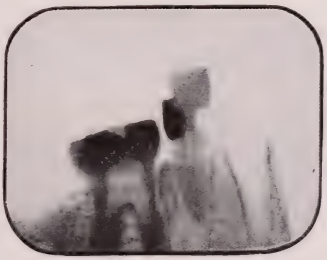
The object of putting the tooth in the socket before skiagraphing was to more nearly simulate mouth conditions than

Fig. 1.

Note that the infinitesimal amount of chloro-percha in the root-canal caused a shadow, as shown in Fig. 2.

Fig. 2.

Fig. 3.



was done by Dr. Davis when he skiagraphed the tooth *not* surrounded by bone.

CONCLUSIONS.

(1) A *very slight amount* of chloropercha in a root-canal can undoubtedly be shown in a skiagraph.

(2) Where a root-canal shows no evidence of such a root-canal filling, it can be safely assumed that there is no filling therein. And furthermore, the examination of skiagraphs of hundreds of pulpless teeth reveals the fact that while many, if not most of them, are not filled to their apices, the conditions about the ends of the roots are *apparently* healthy.

Yours respectfully,

C. EDMUND KELLS.

NEW ORLEANS, LA., May 14, 1918.

"Iodo-Glycerole."

(See "Iodo-Glycerole," DENTAL COSMOS for January 1918, page 50.)

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—In the claim which he sets up with regard to priority in the matter of the introduction to the service of medicine of the well-known iodin and glycerin compound, Dr. Talbot is, I think, laboring under a misapprehension.

I extract from a volume ("Science and Art of Surgery," Ericksen, 8th edition, vol. ii, p. 414), which lies in front of me, the following:

> Injection of the sac [the author is discussing the treatment of spina bifida] with various preparations of iodin was a method of treatment which had frequently been resorted to without success before 1876. In that year, however, Morton of Glasgow suggested the use of the following preparation: Iodin gr. x, potassium iodid gr. xxx, glycerin 1 oz.

Those of your readers who may be interested in the question will notice, in the quotation which I have given, that not merely had Dr. Talbot's "mixture" been anticipated by some four years, but that, strangely enough, Dr. Morton had in his formula included potassium iodid, though not for the purpose which Dr. Talbot would have us believe.

Very truly yours,

R. WYNNE ROUW.

8 UPPER WIMPOLE ST., LONDON, ENG.
February 12, 1918.

[The foregoing communication gave rise to the following correspondence, which is self-explanatory.—ED. DENTAL COSMOS.]

MR. R. WYNNE ROUW:

Dear Sir,—I have to acknowledge receipt of your communication relative to iodo-glycerole. Before publishing your note in the DENTAL COSMOS, let me call your attention to the fact that the iodo-glycerole of Talbot does not contain potassium iodid, but zinc iodid, which confers upon the compound the astringent and doubtless antiseptic properties of zinc iodid, which in so far as they are peculiar to zinc iodid are not possessed by the formula of Morton of Glasgow as quoted by Ericksen. Morton's formula utilizes potassium iodid to increase the solubility of the iodin, thereby obtaining a stronger solution in the same manner as was done in Lugol's formula, which consists of equal parts of iodin and potassium iodid with an amount of water equal to the weight of the other two ingredients, thus making a very concentrated caustic iodin solution. I am not at the present moment informed as to the date when Lugol's formula was first published, but you will see, however, that Talbot's differs essentially both from Morton's and Lugol's iodin solutions, for which reason I have thought best to call your attention to the matter, and await your further advices before publishing your comment.

Very truly yours,

EDWARD C. KIRK.

PHILADELPHIA, PA., March 12, 1918.

TO THE EDITOR OF THE DENTAL COSMOS:

Dear Sir,—Many thanks for your letter. Let me assure you that I am fully acquainted with the differences to be found in the formulæ of Drs. Talbot and Morton, and that

I claim to know something of the therapeutic values of both compounds.

I shall be greatly obliged if you can find room in the columns of your journal for the note which I have already addressed to you.

Very truly yours,
R. WYNNE ROUW.

April 10, 1918.

Replantation of Teeth.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—In explanation of the two questions which have been raised by the reviewer of my paper at page 261 of the DENTAL COSMOS for March 1918:

The reasons why I postpone so relatively long the replantation of teeth are, first, as has been correctly assumed, to permit time for the eradication of the apical disease focus; second, to permit a certain amount of new bony formation within the alveolus, or the contraction of its lumen, because I have been taught by experience that if the root of the replanted tooth enters very tightly into its alveolus, the contact of the two surfaces is sure and the process of ankylosis will be prompt.

In answer to the second question, relating to the absence of radiographic data: Radiography, as applied to the teeth at the time of my three replantations, had not yet obtained very successful results for diagnostic purposes in Italy. Not having then the possibility of taking radiographic pictures myself, I had them made by radiographers in many cases, but not satisfactorily, and this is the reason why they do not appear in my article.

Very truly,
ANGELO CHIAVARO.

ROME, ITALY.

"Technique of Root Amputation."

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—On page 520 of the June issue of the DENTAL COSMOS my friend Dr. C. Edmund Kells of New Orleans has a few questions to ask regarding my paper on "The Technique of Root Amputation" as published in the May issue of your journal, as follows:

(1) After the cavity is sponged and appears "as clean as a billiard ball," why should its surface be painted with iodin? What does the iodin do to this perfectly clean and sterile surface?

Ans. The quick-drying coating of iodin-acetone is applied to the clean cavity for the purpose of furnishing a moist surface for holding the surgical powder in place. If there is any objection to the *iodin* coating, a physiologic salt solution will answer, but it does not dry.

(2) What action upon this iodized, clean and sterile surface has the surgical powder?

Ans. The surgical powder facilitates the coagulation of the blood and renders the blood-clot sterile for a reasonable time.

(3) The doctor says that when a broken instrument is in the canal, it is sometimes necessary to "push the obstructing agent back into the canal."

Ans. To "push the obstructing agent back into the canal" possibly does not clearly express what I intended to say. It is to be understood, of course, that the broken instrument is pushed from the opening of the root-canal at the excised apical end into the pulp chamber, and the foramen is then closed with soft amalgam as described in the original paper under the discussion of the resection of the palatine root of the upper molars.

(4) Success is merely a relative term, as is well known. Many a surgeon has been discussing the details of a successful operation while the friends of the subject were putting flowers on the grave.

Ans. As I have stated on page 309, "as yet he (the writer) has had no occasion to examine postmortem specimens." The reported 200 cases without a single failure have been operated upon within a period of a few months up to four years. In the cases in which we had occasion to examine the patient at a later period by physical means, including X-rays, no further disturbance was noted, and consequently, in our opinion, this would constitute a cure. We have of course no means of saying that this is equally true of the cases which have not returned for examination, but it is to be assumed that if trouble had arisen the patients would have returned to us for consultation.

Sincerely yours,

HERMANN PRINZ.

PHILADELPHIA, June 11, 1918.

PROCEEDINGS OF SOCIETIES

Academy of Stomatology of Philadelphia.

Monthly Meeting, Thursday, April 18, 1918.

THE meeting was called to order by the president, Dr. William A. Jaquette, at 9 P.M.

The minutes of the previous meeting were read and approved.

The report of the Council was read and accepted.

Mr. WILLIAM C. FREEMAN was introduced by the President, and spoke on the subject of the Third Liberty Loan.

Dr. ARTHUR H. MERRITT, the essayist of the evening, then read a paper entitled "The Pathology, Etiology, and Treatment of Pyorrhea."

[This paper is printed in full at page 574 of the present issue of the DENTAL COSMOS.]

DISCUSSION.

Dr. Paul R. Stillman, New York City. *Mr. President and Members,*—I came down to Philadelphia this afternoon by invitation of this society and at the request of Dr. Merritt, to fulfil the traditions of a discusser. Naturally, one would be expected under the circumstances to say that this paper was "a very good paper," but I am not going to say that; I am going to say, though, that in my opinion, at least, it is the best effort upon this subject I have ever heard. It is so rich in thought, so concise and free from verbiage, that in listening to it one seems to miss much. I shall be glad when I can have a copy to read. I shall be glad to read and study it when it is published.

As it is the traditional duty of a discusser to criticize as well as praise, I wish to take exception to Dr. Merritt's free use of the term "pyorrhea"—a word which means literally "a flow of pus." I believe this word should be limited in its use to its literal meaning, and that it should never be employed in the broad way which is still common, and in which Dr. Merritt uses it here. I prefer the more scientific word periodontoclasia or its synonym dental periclasia—a breaking-down of the supporting structures of the teeth. While periodontoclasia may not be any more euphonious than pyorrhea, it is certainly more scientific. Not every case of dental periclasia is accompanied by pus flow, yet every case of pyorrhea must have this symptom if we use the term correctly.

I wish to say a few words to you on the theme of treatment to supplement the excellent statements in the paper on this phase of the subject. Everyone who treats disease recognizes that there is some inherent force in the organism which brings about the "cure." "Man does not cure; God cures." If we are able to remove all of the factors which are contributing to the condition, no matter what that condition may be, natural forces will be awakened which will produce health. Everyone who succeeds in having his cases of dental periclasia return to health must necessarily do precisely the same things in treatment. One may emphasize the importance of one phase of treatment above another; one may see a superior efficacy in drugs, in gas, in root surgery, or in polishing operations, but if any of the several factors which are grouped in the etiology of the disease are disregarded in diagnosis, failure will result. A correct diagnosis is of paramount importance in this work. How shall we make a diagnosis? Whenever nature is in trouble and is unable to help herself out of a difficulty she hangs out a sign. Periodontoclasia is a purely biological problem where diagnosis is concerned. In diagnosis for treatment we must forget for the moment all pathology, and think in terms of biology. Pathology deals with cells which are dead. We are interested in diagnosis for treatment only in the living cells. We must conserve and stimulate these living cells into their normal activity. Suppose we look down from our veranda and see a patch of yellow grass upon our lawn. Our interest in the treatment of this grass is instant: We investigate. In other words, we diagnose; we desire to know why the grass seems to be dying. What has caused this disease? Is it bad soil, lack of grass food, or moisture? Or has the chauffeur emptied the crank-case of the car or the cook the ice-cream freezer on the lawn? We examine, make a diagnosis, basing our treatment upon our findings, and the lawn is restored.

Now, the conditions are identical in the mouth. Nature hangs out a sign and we diagnose. One should be warned against over-treatment. Too much water will kill the cell life on the lawn, and too much treatment will discourage cell activity in the investing tissues. Experience alone will direct in the one case as in the other. One can bedevil a case by too much treatment as innocently as a baby may love a kitten to death. Cases which are advanced in disease need time for convalescence; six months or perhaps a year for many.

Dr. Merritt deserves great praise for the excellent paper which he has brought here tonight. He has given us more thought, and in fewer useless words, than is usually found in the literature of this subject.

Dr. A. W. Doubleday, Boston, Mass. I am grateful for the opportunity of being here tonight. I am thankful to your society and to Dr. Merritt for asking me. We have heard a paper that is beyond discussion. It must be, and I think has been, accepted by all of us. There are one or two points which have occurred to me during the reading of the paper that I wish to bring out, and which perhaps Dr. Merritt will speak about in concluding.

One of these is the cases of severe anemia with low hemoglobin. It occurs to me that in these cases we get a class of pus production which is always termed

pyorrhea. I can recall at least three cases in my practice. Two were in young women, about sixteen years of age. My opinion was that they were overactive in social duties, and had no time to sleep or rest. Their hemoglobin was down to about 60. I called the attention of their parents to the condition. One case was sent to Manheim, Germany, where the young woman took the iron cure. She came back to Boston much improved, and later went back a second time. Today she is as healthy a person as we could expect to see. She has been in France for a year, doing hard work, and is now back in Boston. There was a disappearance of pus, from whatever cause it may have been. In my opinion, it was the result of restoration of nearly normal metabolism in the patient.

Another case was that of a man of fifty years. He had no symptoms of what I would call chronic pyorrhea, but he had lost one tooth after another, and never did I see more than one tooth with pus coming from it at any one time. In none of these teeth could I stop this flow of pus. I did not know how. Perhaps, after hearing Dr. Merritt's paper, I might have tried. I was obliged to extract one tooth after another, all in the course of three years. I made an analysis of the man's saliva in 1917, and found tubercle bacilli present. He had an intestinal tuberculosis. This man, two weeks ago, had his right arm removed, tuberculosis having localized in that point. I think that his anemic condition had more or less to do with the pus coming from around the teeth. In none of the teeth was there a filling, and there was apparently no caries.

There is another point that I want to bring out, and that is the relation of different kinds of anemias to pyorrhea. Where we have severe anemia we have a deficiency in the lime salts and an abundance of caries, and until we correct this deficiency in lime salts, we will have a prolific carious condition. With the exception of this pyorrhetic condition of which I have just spoken, I have never found pyorrhea and caries associated. On the other hand, in severe cases of pyorrhea in which there is calculus present I have in no case that I can recall been able to find carious teeth associated with the pus-producing teeth; and I am wondering whether caries and pyorrhea do occur together.

Dr. J. Clarence Salvas, Philadelphia. I want to congratulate Dr. Merritt on the splendid paper he has presented to us this evening. It should be read and studied, that a clearer conception and a more intelligent understanding might be gained of this distressing and destructive disease—a disease that has been much written about and much talked about, but, with all, little understood. Pyorrhea is the *bête noire* of a large majority of practitioners. I venture to say that there is not one in this audience who, if he has read but a small part of the voluminous contributions to dental literature on this subject, will not confess that he has been lost in a maze of conflicting theories. This is not surprising in view of the fact that there is as yet no agreement among our investigators as to the etiology of the disease. There is one group of able operators who believe it to be secondary to constitutional disease; another group who believe it to be an entirely local condition, and still a third group who believe that both conditions are causative factors, that is, that local irritation is the exciting cause, which is effective only where there exists a predisposition to the disease from faulty metabolism.

Pyorrhea is an infectious disease, but in contrast to other infectious diseases of the body, such as typhoid fever, measles, smallpox, etc., all of which present certain well-defined symptoms which identify them unmistakably as the disease respectively in question, there is in pyorrhea a great variation in the symptomatic phenomena presented in different conditions. You are all familiar with the case of the root covered with calcareous deposits and pus oozing from the socket, while on the other hand there is the equally common condition of the root free from calcareous matter, the root perfectly smooth, surgical treatment revealing the remains of necrotic mem-

brane, and there is more or less pus. Again there is the condition which is so common in which the investing tissues are apparently healthy but on examination a low insidious inflammation involving the subgingival tissues is found; there is invariably a pocket extending almost to the apex, and frequently an absence of pus. Thus we have three distinct conditions, but all are symptoms of the one disease.

I am particularly impressed with the nice distinction which Dr. Merritt makes between malocclusion and faulty occlusion. Malocclusion, or the improper relation between teeth in occlusion, and traumatic occlusion are undoubtedly the cause of a large majority of cases of pyorrhea. It is important that we recognize these etiological factors, for unless they are corrected, our work, however skilfully executed, will be haphazard and futile.

Dr. H. B. Matteossian. It has been a pleasure to listen to the very interesting and valuable paper presented this evening, covering all features of this disease —pyorrhea—which, like the poor, we have always with us, as completely in this single address as one could do within the limited scope of such a paper. There are many valuable points that the essayist has brought up, not the least of which is the emphasis laid on the necessity of a study of the anatomical construction of the parts. The free margin of the gums, being smooth and loose, not taut, is protected against the invasion of microorganisms at the most vulnerable point of the gingiva. It defends itself against irritation; when the irritants are so strong and constant that the inflammatory reaction set up is inadequate to overcome them, the final pathological effects, which you have heard so graphically described, follow.

Another valuable point is the connection between certain diseases and pyorrhea, both as predisposing causes and sometimes as results. It is no exaggeration to say that pyorrhea "is not infrequently the indirect cause of these diseases," indeed it is often the direct cause. It may produce systemic infection that may end fatally. There have been cases of enterocolitis, for example, caused by pyorrhea, where death has ensued, pyorrhea being the original disease, and the intestinal infection a sequel thereof.

Dr. Merritt has raised many points that might be discussed, but I shall limit myself to a few.

In connection with traumatic occlusion, which he has fittingly noted as an etiological factor, I should like to report briefly some observations I have made on the mouths of the people while traveling in Asia Minor. In an examination of six or seven hundred mouths, there was disclosed a peculiar condition, in that the atavistic attenuation of the alveolar process, so frequent in the western nations, was entirely absent. The teeth were beautifully formed, the jaws normal, the alveolar septum strong and well built; only two per cent. presented slight conditions of malocclusion. But, on the other hand, about sixty or seventy per cent., even of young people, presented pyorrhea, with large accumulations of tartar. The etiology of this was very interesting to study. I had a very short time in which to do this, but there were two observations that I made. One was with regard to the relation of heredity to the conditions found. There were signs of uric acid diathesis in these people. There was also, in nearly one hundred per cent., absence of the use of the toothbrush. Every one of these people exercised a very careful finger massage on the teeth and gums instead of using a brush. This shows the inadequacy of such treatment, and the great value of such energetic brush massage as the essayist has described, demonstrating the good results that are bound to ensue when the patient faithfully co-operates in preserving the health of the tissues after they are restored to normal.

A very interesting point is the question of reattachment. I confess to much curiosity, a frankly skeptical curiosity, as to proof of the bony nature of this reattachment. That tightening occurs we know, but that it is of a bony nature, we should like to see proved by radiographs or by sections. The alveolar process

is in its essence a transitory structure. Wherever there is a lesion of this structure, there is a tendency to excess of osteoclastic activity over osteoblastic. Hecker was the only one who presented a slide showing the regeneration of blood-vessels, making therefrom the farfetched deduction that bony regeneration would follow. Reattachment takes place, but we should be correct in ascribing it to fibroblastic activity.

The name "pyorrhea," as has frequently been repeated, is unfortunate. The name Talbot gave this disease during his admirable and fertile studies in this connection is much preferable.

There is another point regarding systemic diseases, that whereas they cannot be said to be directly causative of pyorrhea there is only one that simulates pyorrhea, and that is syphilis. There is a form of syphilitic manifestation in the gums which is a feature of that disease; it looks like pyorrhea, but is not. It is different in many ways, although there is a production of pus. There is blueness of the gum margin, due to venous stasis. Its relative intensity is often an indication of the comparative resistance of the individual, and the virulence of the infection. It is helped by the removal of local irritants. It is one of the manifestations of lues, not what we call pyorrhea, but a condition simulating it.

Dr. Alfred P. Lee. Dr. Merritt's definition of pyorrhea alveolaris as a disease is a logical one, viewed from both clinical and histological standpoints. I had hoped that he would go farther, and classify or present recognized types of the disease; for surely there are as many varieties of this affection, causing a wasting of tooth investment, as there are varieties of rheumatism or catarrh, or many other bodily ailments.

Do not misunderstand me as believing that the different forms of pyorrhea are necessarily due to a difference in the bacterial content of the so-called pyorrhea pocket, for I wholly agree with the essayist in believing that the organisms found in these pockets have no etiological relationship to the disease. They are entirely incidental and doubtless, as he says, present not a qualitative, but a vast quantitative difference from those found in the normal mouth, due to the extremely favorable conditions offered by the presence of these pockets. This fact has proved, to me at least, that we have little to hope for in applying therapeusis to our line of treatment. We must rely upon surgery, elimination of faulty conditions, and restoration of normal conditions.

Clinical observations strongly incline me to the belief that there are several well-defined types of pyorrhea, and that these types are largely determined by predisposing causes. If this be true, then the name pyorrhea alveolaris is a most unfortunate one under which to group the whole family. Almost any one of the four or five other terms used would appear broader and more comprehensive.

The essayist's idea that a frail bony support is a contributing factor in this disease is one that interests me very much. This would seem to me to apply particularly to those cases in which an individual whose teeth are frailly supported is called upon to do the same work with his jaws as is the person whose teeth are more substantially supported. For instance, the soldier of small size is called upon to eat the same ration, and in the same length of time, as that given to his brother soldier, of giant frame. If this state of affairs were to continue over a long period of time, it is only mechanical sense to assume that the teeth of the frailer man would loosen, and their surrounding structures become diseased, before those of the man of massive frame would succumb. However, were it possible to give each of these men a ration and work corresponding to the thickness and density of the bony structure surrounding his teeth, this factor could be dismissed from our etiological studies.

I use and strongly advocate the method suggested by the essayist, of placing thin carbon paper between occluding teeth, in order to ascertain faulty occlusion that may result in trauma. Possibly no one thing in my own line of treatment has

produced more satisfactory results to the patient, and therefore to the operator, than this dressing down of high surfaces to prevent wound and shock to already irritated pericemental membranes.

Mouth hygiene, of course, plays an important part in successful pyorrhea treatment. How often, though, are we confronted with mouths in which the progress of the disease is notably rapid, although a mouth hygiene above the average has been regularly observed. On the other hand, a visit to our dental clinics will show cases in which the progress of pyorrhea is of slow character, although the toothbrush is a very occasional luxury.

There is no point in Dr. Merritt's paper that I wish to emphasize more than that where he says, "Another prolific cause of gingival irritation is faulty contact points." So many fillings are inserted with the apparent idea that if they "touch" the approximating tooth or filling, that is all that is to be desired. No attention is paid to the matter of placing the contact point exactly where nature intended it should be. Add to this the number of fillings that present flat surface contact to their neighbors and those that have no contact, and it is no wonder that we find these mouths with the gingivæ highly irritated and pockets established by food impaction. When it is just as easy to place the contact where it belongs, it is difficult to understand why so many men apparently go out of their way to place it elsewhere.

Also, there is no point in the essayist's paper upon which I wish to express more doubt than upon the statement that "reattachment takes place." That a "physiological contact between the vital cells at the cementum and the overlying soft tissues" may occur is highly probable, but I have yet to see demonstrated the reproduction of lost pericemental fibers. By re-establishing healthy conditions we get a hugging or adaptation of the tooth's remaining surrounding tissue; but I fear that the "new bone deposited about the roots," as claimed by Dr. Merritt, is of very slight degree. He says that "reattachment takes place, *as a rule,* in the hands of the skilled periodontist." Evidently few of us have attained to that skill.

I trust that I am open to conviction, and I hope I am mistaken; but I have made, and yet make, the claim that the condition known as pyorrhea alveolaris (not a local gingivitis) is incurable. I so state to my patients, at the same time advising a line of treatment very similar to that advocated by Dr. Merritt; but I explain to them that any portion of the connecting membrane between the tooth and its socket, once lost, can never be replaced, although intensive treatment and watchfulness will reduce the progress of the wasting process to a minimum.

To revert to a statement made by the essayist in the earlier part of his very excellent paper: "As a rule, the progress of the disease is slow, often years elapsing between the initial gingival irritation and final exfoliation of the tooth," I would say that I feel that this exactly portrays the life-cycle of the pyorrhetic mouth. The question of *when* the patient loses his teeth so affected is simply a matter of months, years, or decades, depending upon many factors, not the least of which is the degree of surgical skill expended upon him by his dentist.

Dr. J. C. Curry. Dr. Merritt has made no statement in regard to the treatment of pyorrhea by splinting the teeth. I should like to know whether he has ever practiced that method in treating pyorrhea cases.

Dr. Doubleday. May I ask for one more explanation? That is, the differentiation between trauma and malocclusion. Where I have used the word trauma I have referred to the results of violence. Where there has been trauma to any extent, I have usually found pulp stones, particularly if there has been a great amount of trauma. I have used the word malocclusion to mean mechanical stress, coming from inclined planes, etc. I recall a case in which a woman, within two years, developed pulp stones in five teeth. Fillings had been removed, and the teeth had been restored by grinding the sulci and inserting inlays to open the bite. Out of five of the six teeth

thus treated I removed twenty-one pulp stones. She had suffered from insomnia to such an extent that she was unable to sleep more than an hour at a time for two years.

Dr. Merritt (closing the discussion). I have only a few words to say in closing. In the first place, I do not pretend to know it all. On the contrary, I know that I do not know much about pyorrhea, but I am interested in knowing more. I assume that you are also; and the best way to learn is to get together and exchange ideas, as we have done tonight.

There have been some questions asked that I shall not be able to answer. Many more might be asked to which the wisest of us could not reply. We all ought to know more about pyorrhea than we know, and if we did we would do better work for our patients than we are doing; and the only way in which we are going to accomplish this is by realizing our ignorance, and taking steps to correct it.

I myself realize that pyorrhea alveolaris is a very unsatisfactory term. In this paper I at first used the word periodontoclasia, but upon reflection I went back to the old term, because I did not want to confuse your minds by the introduction of a new word.

As to the relation of pyorrhea to systemic infection, I can only say that I do not know. That it plays an important part there is no doubt, but just what it is, or just how it influences prognosis or acts as an exciting or predisposing cause, I do not know.

Now as to the question of reattachment: What the nature of it is, no one can say. There has never been a histological examination made of regenerated tissues of this kind. That they are the same as those tissues replaced I do not believe, but that they answer the purpose is true. That reattachment takes place there is no doubt, and if it does not in a given case it is because the conditions have not been met; it may be through faulty technique, or it may have been because of conditions which no human being could control. We are dealing with an environment constantly charged with organisms and food débris. When Dr. Lee tells his patients that pyorrhea is incurable, I believe he is doing them and the profession an injustice. Pyorrhea is a curable disease, though it may, through long neglect, reach an incurable stage. The sooner that this fact finds its way into the minds of the profession the better it will be for our patients.

A rising vote of thanks was given Dr. Merritt, and the meeting adjourned at 10.30 P.M.

THE DENTAL COSMOS

A MONTHLY RECORD OF DENTAL SCIENCE.

Devoted to the Interests of the Profession.

EDWARD C. KIRK, D.D.S., Sc.D., LL.D., *Editor.*
L. PIERCE ANTHONY, D.D.S., *Associate Editor.*

PUBLISHED BY THE S. S. WHITE DENTAL MFG. CO., PHILADELPHIA, PA.

SUBSCRIPTION PRICE, including postage, $1.00 a year to all parts of the United States, Hawaiian Islands, the Philippines, Guam, Porto Rico, Virgin Islands, Cuba, and Mexico. Canada, $1.40. To other foreign countries, $1.75 a year.

Original contributions, society reports, and other correspondence intended for publication should be addressed to the EDITOR, Lock Box 1615, Philadelphia, Pa.

Subscriptions and communications relating to advertisements should be addressed to the BUSINESS MANAGER of the DENTAL COSMOS, Lock Box 1615, Philadelphia, Pa.

PHILADELPHIA, JULY 1918.

EDITORIAL DEPARTMENT

Oral Sepsis.

THERE has probably never appeared in medical or dental literature an article which has had a more profound influence on the thought and action of the medical and dental professions than the article by Sir William Hunter entitled "The Rôle of Sepsis and of Antisepsis in Medicine," which appeared in the *Lancet* for January 1911, and which we have republished at page 585 of the present issue.

It has been an invariable rule of the DENTAL COSMOS not to republish matter which has appeared elsewhere, but we feel that we are warranted in breaking this long-established rule in the present instance by the importance of the paper in question, and also the desirability from the historical standpoint of permanently recording this epoch-making address in strictly dental literature.

While there have been numerous references in dental literature to Dr. Hunter's paper, there are doubtless many in the profession who have never read the original address, but there is probably not a member of the profession whose methods of practice have not been materially affected as the result of the profound impression which Dr. Hunter's paper made upon both the medical and dental professions.

When the paper first appeared there was a wave of indignation and even resentment toward the severe indictment which Dr. Hunter made against certain practices in dentistry, and these practices were ably defended by many who were unwilling to accept such a wholesale condemnation of the methods of dental practice which were then in vogue; but no amount of argument could gainsay the evident truth of the soundness of the principles underlying Dr. Hunter's criticism of certain dental operative procedures.

At that time we presented an editorial dealing with the article in question, but our attention was focused more particularly on a review of the paper which was published in *Current Literature,* and which was a flagrant attempt at sensationalism and a palpable misinterpretation of the author's views.

Dr. Hunter was particuarly severe in his criticism of crown and bridge work as practiced in European countries under the name of "American dentistry," a catch phrase which has long been used by incompetent charlatans throughout Europe in exploiting the ignorant and credulous, but which has no relation to the better type of dentistry as it is practiced in America. Many of Dr. Hunter's critics directed their defense of the then prevalent methods of practice at this particular phase of the article, which the reader will readily see is but incident to the broad question under consideration.

That Dr. Hunter's criticism of crown and bridge work as then practiced was well founded has been fully exemplified in the almost complete change in the methods practiced by present-day crown and bridge workers.

After the first wave of resentment against this criticism of our methods of practice had spent its force, it was soon recognized by the thinking members of the profession that the criticism, although a severe one, was just, and a calm and sober consideration of the question involved resulted in the awakening of the profes-

sion to the necessity of a proper consideration of the principles laid down by Dr. Hunter.

Truly it is an ill wind that blows no good, and one of the greatest goods that came from this epoch-making effort was the immediate and complete recognition which came from the medical profession of the potentiality for evil present in septic oral conditions—a contention which the dental profession had long endeavored to impress upon their medical brethren. Indeed, the medical profession recognized these potentialities for evil with such enthusiasm that we began to see medical men everywhere ascribing to mouth conditions almost every disease which they could not readily diagnose, and advocating, even urging, the indiscriminate extraction of teeth, and, as a matter of fact, this over-enthusiastic acceptation of oral sepsis and faulty dentistry as the possible cause of many puzzling conditions met with by the medical practitioner is not yet on the wane.

The most enthusiastic champions of dental hygiene as an important factor in general bodily health could not have hoped for such an overwhelming acceptance of all for which they had contended, but unfortunately this recognition of dentistry was entirely from the negative viewpoint of the baneful effects of improper dental practice. The medical profession as a whole has not yet conceded the contention of dentistry with regard to the beneficial results of proper methods of dental practice on the bodily health.

Some of the more thoughtful men of the medical profession, however, have come to realize what an important rôle preventive dentistry must play if we are to realize all that is hoped for from preventive medicine. Indeed, it was none other than Dr. Charles H. Mayo who said, "It is evident that the next great step in medical progress in the line of preventive medicine should be made by the dentists. The question is, Will they do it?" The dental profession has taken that step, and we feel confident in making the assertion that it has long since cast aside its septic swaddling-clothes.

One of the most beneficial results coming from this wholesale indictment of empirical dental practices by Dr. Hunter was the impetus given to research work and the study of dental conditions in their relationship to systemic diseases, until today the profes-

sion is wide awake to the fact that the mechanical aspect of dentistry, while an important one, can properly serve its purpose only when practiced with a full knowledge of the physiological functioning of the mouth as an important organ of the bodily economy. We believe also that this paper was the indirect source of considerable stimulus to the oral hygiene propaganda which has been so zealously promulgated by the dental profession in recent years.

We respectfully urge all our readers to study carefully Dr. Hunter's paper, and although it is some seven years since its first appearance, we feel that it is just as timely now as when it was originally published. We are still of the opinion as expressed in 1911 when we first made editorial reference to the paper in question: "While some of the statements made by Dr. Hunter are perhaps rather excessive, they are on the whole, we believe, in accordance with the general facts of the situation. Though the truth is frequently unpleasant, it is never unwholesome, and if the stimulus of Dr. Hunter's pointed criticism shall arouse the organized dental profession to renewed activity in the effort to eradicate the ignorant and incompetent practice of dentistry, he will have conferred a boon upon humanity." We believe now that Dr. Hunter's paper accomplished all and even more than we hoped for it at that time.

"l'Aide Confraternelle" Honor Roll.

In response to our appeal in the January issue we have received the following additional contributions to "l'Aide Confraternelle":

Dr. Arthur Zentler, New York City	$10.00
Dr. J. L. Appleton, Philadelphia	14.00
	$24.00
Previously received	250.50
Total	$274.50

Bibliographical

Anatomy and Histology of the Mouth and Teeth. By I. Norman Broomell, D.D.S., Professor of Dental Anatomy and Clinical Dentistry, Philadelphia Dental College, and formerly Dean and Professor of Prosthetic Dentistry, Dental Anatomy, and Histology, Dental Department, Medico-Chirurgical College of Philadelphia; and Philipp Fischelis, M.D., Associate Professor of Histology and Demonstrator in Embryology, Medico-Chirurgical College of Philadelphia. Fifth Edition, revised, with 368 illustrations. Price $3.00. Philadelphia: P. Blakiston's Son & Co. 1917.

The first part of this well-known work, that dealing with the gross anatomy, has received some revision in regard to form and arrangement. The subject-content has not been altered. The osteology, myology, the vascular and nerve supply of the facial region receive the ordinary description to be found in any one of a number of the briefer works on human anatomy. The second part, that which deals with the histology, histogenesis, and embryology of the dental structures, has not been revised.

There are four most serious and salient adverse criticisms to be made of this work:

(1) The rather recent appreciation of the multiplicity of apical foramina, which has so deep a clinical significance, is apparently completely ignored; indeed, on pages 191 and 361 one is led to believe that each tooth has but a single apical foramen.

(2) The figures throughout the book are frequently too indistinct, and too often lack adequate correlation with the text descriptions. In the first part of the work, the figures illustrating the anatomy of the individual teeth should be made decidedly clearer and sharper, and larger, even at the sacrifice of some of the verbal description.

(3) It is unfortunate that the obsolete and anthropomorphic nomenclature of dental anatomy should be retained. There is no excuse for further delay in accepting the terminology which is in rational harmony with that of comparative anatomy.

(4) The periodontal ligament (misnamed by Broomell and Fischelis) is a structure of such high import to the dentist that it deserves a full discussion. The most serious error of judgment in the putting together of this book is that the student is referred "for full histological description" of this structure to a former edition. In the present (the fifth) edition there are devoted two pages, including one diagrammatic figure, to this topic.

In anticipation of a future revision of the second part of this book there are a number of items which would demand consideration. Nasmyth's membrane is described following the section on the dental pulp and preceding the section on "the alveolo-dental membrane." Logically it should immediately precede the

description of enamel. Contrary to the statement on page 361, lymphatics have been described in the pulp. (DENTAL COSMOS, 1917, p. 436.) Lacunæ are described as normal in the cementum, whereas there is excellent reason to believe that their occurrence there is an indication of a pathological process; the very description by the authors supports the latter view. The consideration of the innervation of the dentin needs amplification. In a subsequent edition it will be interesting to see how Bolk's views on human odontogenesis (DENTAL COSMOS, 1913, p. 1058) will be treated.

The defects and deficiencies of this book have been emphasized because much is expected of a work which has exerted and undoubtedly will exert a wide influence on the *personnel* of the dental profession. Under the guidance of a teacher of originality and resource, a class would gain from this book the basic information on dental anatomy and histology which is prerequisite for their future studies.

DENTAL AND ORAL RADIOGRAPHY. By JAMES DAVID MCCOY. Second Edition. Price $2.50. St. Louis: C. V. Mosby Company, 1918.

The unqualified success of the first edition of this work amply justified the appearance of this second edition. The author has kept his attention focused on the beginner (and we must realize that all practitioners are as yet beginners in this highly important phase of dentistry).

The spirit of McCoy is that of unpretentiousness, a virtue all too sadly lacking in many modern dental publications. The book possesses that trinity of charms —brevity, simplicity, and clarity. In choice of terms the author is wisely conservative. He consciously avoids recognition of such parvenus as radiolucency, radiopacity, etc.

Only in two particulars is one disappointed: one hunts in vain for any mention of stereoscopic radiographs in dentistry, and the crucial chapter—that on the Interpretation of Dental and Oral Radiograms—is far too short. This chapter is the "why" of the whole book, and yet it occupies only about one-twelfth of the text.

This book is needed by every dentist who employs radiography, and is still more urgently needed by those dentists who have not yet resorted to this indispensable adjunct.

A TEXTBOOK OF DENTAL HISTOLOGY AND EMBRYOLOGY, INCLUDING LABORATORY DIRECTIONS. By FREDERICK BOGUE NOYES, B.A., D.D.S. Professor of Histology, Northwestern University Dental School, 1896–1914; Professor of Histology and Orthodontia, College of Dentistry, University of Illinois, 1914. Second Edition, revised and enlarged. With 337 illustrations and 21 plates. Philadelphia and New York: Lea and Febiger, 1915. Price $4.50.

The improved appearance, external and internal, of this book is the only significant change from the 1912 edition. The author has revised the illustrations in particular, and although the alterations have been slight, the publisher has ably co-operated, so that the pictures are very much more distinct than those of the first edition. Thirteen illustrations have been omitted, the book being thereby improved.

No attempt has been made to eliminate the rather serious errors of judgment of the first edition. Unnecessary and inappropriate sections still persist.

The purposes of the book would be more directly and forcibly realized (1) by restricting the attention to *dental* histology and embryology, and (2) by avoiding the flavor of provincialism, so justly criticized in the DENTAL COSMOS review of the first edition.

The abbreviation or omission of certain generalities of animal morphology (Chapters I, XXV, and XXVI, except the section on the Stomadeum, at the bottom of page 296, which could be incorporated with modifications in the following chapter), the elimination of those chapters (VI to XI, inclusive) which properly belong to a consideration of operative dentistry (although parts of these of histological import not contained elsewhere might be retained and inserted in other chapters), the omission of the chapter (XIX) on bone formation, and the omission of the chapter (XVI) on the pathology of the dental pulp, would free the book from the charge that it contained much matter not pertinent in a textbook on *dental* histology and embryology, and would emphasize those topics whose popularization it is the aim of the book to promote.

The charge of localism can be evidenced by a large number of details. One of these is that the space given to the epithelial rests within the periodontal ligament is out of all proportion to their histological importance, while their sinister potentiality which would justify this space, as constituting a *locus minoris resistentiæ,* is not considered. The discussion of the distribution of the nerves in the dental pulp in relation to the question of the sensitivity of the dentin is notably insufficient. It contains at page 177 the following quotation: "The most recent work upon this subject was done some ten or twelve years ago by Prof. Carl Huber," entirely ignoring the work of Mummery, Dependorf, and Fritsch. This is merely one instance where the paucity of references to the literature indicates a lack of familiarity with the work of other men.

In addition to the two general criticisms which have been detailed above, the following miscellanies may be mentioned: Nasmyth's membrane apparently is considered of not sufficient importance to be mentioned. The soft tissues of the mouth (see Chapter XXIV) deserve a far more extensive description than they here receive. Tooth development (Chapter XXVII) and especially the histogenesis of the dental tissues, are all too cursorily treated. In a future edition it will be of interest to see what influence Bolk's observations will have had upon these subjects. The value of the book would be enhanced by a liberal expansion of the index.

In summary, the general impression created by a critical and sympathetic study of this book is that it was written not by a professional histologist, but by a man who is primarily a dental clinician.

ORAL SEPSIS IN ITS RELATIONSHIP TO SYSTEMIC DISEASE. By WILLIAM W. DUKE, M.D., Ph.B., Kansas City, Mo. Professor of Experimental Medicine in the University of Kansas School of Medicine; Professor in the Department of Medicine in Western Dental College; Visiting Physician to Christian Church Hospital; Consulting Physician to Kansas City General Hospital, Kansas City, Mo., and to St. Margaret's Hospital, Kansas City, Kansas. With 170 illustrations. St. Louis: C. V. Mosby Company, 1918. Price $2.50.

The title of this little book makes one instinctively think of F. Billings' "Focal

Infection" (see DENTAL COSMOS, 1917, p. 927). Both works are equally valuable to him who would become conversant with this subject. Duke avows that "The main purpose of this volume has been to assemble facts which show, first of all, that dental sepsis is an extremely common condition, and second, that it may cause serious systemic disorders in many different ways."

The book is essentially a monograph "based upon an experience with more than 1000 carefully studied medical cases observed in a consulting-office practice." Hence much of the material is original, and is accessible nowhere else.

The historical introduction is an interesting reference to a few case histories of Benjamin Rush's. Unfortunately there is no attempt to present in due proportion and true perspective the history of the concept of oral foci of systemic infection. In spite of an admirable bibliography, there is no reference to Miller's epochal researches and conclusions, or to the early and original articles of Wm. Hunter.

Duke conscientiously recognizes the dental aspects of the problem, and enters into hearty co-operation with the dental practitioner. Nevertheless his discussion of the etiology and pathology of pyorrhea alveolaris is the poorest section of the book. Nowhere does he seem to realize the fundamental significance of that precocious senile alveolar atrophy signalized by Talbot, Hopewell-Smith, Maurice Roy, and many others, and clearly recognized even in 1778 by John Hunter ("Natural History of the Human Teeth," pt. 2, chap. 2). It was unnecessary in this chapter to refer to Endamœba gingivalis; but if reference to it were to be made, it is absolutely inexcusable to imply priority in the study of this for Bass and Johns, and to ignore Smith and Barrett.

Duke does not accept Rosenow's contentions of the selective tissue affinities of the streptococci so unconditionally as does Billings. The former recognizes that these views are in no way necessary for the acceptance of the importance of oral foci of infection. An interesting phase of this question is the attention given by Duke to the influence of disease in other parts upon oral health and disease (*cf.* DENTAL COSMOS, 1918: L. M. S. Miner, p. 234, and W. Ashley Cooper, p. 530). The importance of this viewpoint has been entirely overshadowed by the volume of the evidence offered for the converse proposition.

The most novel part (Chapter VI) of Duke's monograph is the emphasis laid upon anaphylactic phenomena as a possible explanation of many systemic disturbances attributable ultimately to oral infectious foci. This view, while not entirely new (*cf.* DENTAL COSMOS, 1917: W. S. Hewitt, p. 43; N. P. Barnes, p. 353, and Wm. M. Wright, p. 354), still has never before received the recognition and elaboration we find in this book.

There are 170 illustrations, all well reproduced from roentgenograms of cases of dental infection. The mechanical make-up and appearance of the book are very satisfactory.

Review of Current Dental Literature

[*Lancet*, London, March 30, 1918.]

Non-union of War Fractures of the Mandible. By Percival P. Cole.

The fundamental principle that shapes the procedure of what may be termed the "ideal" school is the restoration of the normal arch and the maintenance of accurate occlusion. In this spirit Cole has dealt with 270 cases. The total of ununited fractures numbers 30, an inclusive non-union percentage of approximately 11. Of these 30 cases union was in 12 absolutely hopeless, judged by no matter how exacting a standard. The resulting exclusive figure is approximately 7 per cent. These figures are ample justification of ideal aims. The ultimate and only test of a successful treatment of a jaw fracture should be a functional one—the patient's ability to masticate ordinary foods. Subjective must take precedence of objective signs. In general terms it may be stated that if both the masseters maintain attachment to the one fragment, disability is relatively slight.

A short summary of the methods employed to remedy these cases of non-union follows. *Plating* has a very small sphere of usefulness, owing to the fact that necessary contact cannot be secured without traction. In cases of old mal-union with considerable deformity the only possible method of dealing with the fragments may be to *wire* them immediately. Where wiring is practicable, success may reasonably be regarded as certain. Where *free autogenous bone-graft* has been resorted to, success is practically assured in at least 60 per cent. of cases. The results obtained by *pedicled grafts* are rapid and certain. To such an extent is this so that in cases of non-union amenable to this treatment success can be practically guaranteed.

Cole summarizes and concludes as follows: The results obtained by the operative treatment of non-union must be concisely summarized thus: Thirty cases have been subjected to operation; in 2 cases the operation has been abandoned as impracticable. Of the remaining 28 cases, 10 have been operated on too recently to permit of any definite statement as to the results obtained. Of the 18 cases whose fate is known, 13 have been completely successful, 2 have been considerably improved, while the other 3 must be regarded as failures. Thus it will be seen that the percentage of success is over 70. There has been no mortality, and post-anesthetic complications have been entirely absent. In all but 2 cases ether has been administered by intratracheal insufflation. The results are such, in a word, as to justify the conclusion that no patient so afflicted should be discharged until operation has not only been offered to, but urged upon him. The functional disability associated with ununited fracture of the mandible is, in the vast majority of cases, an unnecessary disability.

[*Dental Items of Interest*, New York City, March 1918.]

Clasped Partial Dentures Versus Bridge Work. By Hart J. Goslee.

[*Dental Items of Interest*, New York City, February 1918.]

Mobile Bridges. By L. Gormsen.

The realization of the danger of local oral disease as a focus for systemic infection finds an expression in the renaissance of interest in prosthetic appliances. Never did the line between "plate work" and "bridge work" seem more arbitrary than it does today. The one requisite which is exacted of these types of restorations is that they be removable. This feature not only permits of thorough cleansing, but also allows the employment of retaining devices which do not necessitate the devitalization of healthy teeth. In this light the two articles given above become of great value.

In Goslee's opinion, the usefulness of fixed

bridge work scientifically adapted should be confined to small fixtures involving the replacement of one, two, three, or at most four teeth, and when the reconstructive and restorative requirements demand the replacement of more than this number, then some type of removable structure or partial denture is invariably indicated. As a means of differentiation between removable bridge work and partial removable dentures he submits that "partial removable dentures" include that type of fixture where the sustaining (retaining) support of the fixture is obtained only, or at least mainly, by means of contact with the contiguous soft tissues; and that where any form of attachment to either the crowns or roots of the remaining natural teeth is utilized, and acts as a means of retaining the fixture and of precluding any great degree of subsequent settlement of it, thus relieving the soft tissues of the entire responsibility of supporting the fixture, it may be properly classified as a "removable bridge," irrespective of whether the body be made of metal or vulcanite.

Whenever the position of the supporting teeth is favorable, two attachments will usually be all that will be required, though as the number of missing teeth to be supplied increases, and the position of the supporting teeth becomes more unfavorable, it may possibly become necessary to use three. More than two are rarely ever necessary, and only add to the difficulty of obtaining parallelism, and this in turn increases the strain thrown upon those so used.

When a concrete problem arises, and we must make decision of the fixture to be used, the first consideration incident to such selection is the inherent strength of the appliance. To secure this maximum of strength Goslee resorts to the use of "assembled abutments" or "alveolar bars." Abutment pieces in the form of gold or porcelain crowns may often be attached together with a 14-gage round iridio-platinum or clasp-metal wire lying just in contact with the immediate summit of the ridge. This method is especially useful when it is desirable or becomes necessary to use such naturally weak teeth or roots as third molars or second incisors, though it may be found useful when other teeth are involved, and in either arch, and more especially in those so-called "long span" cases where several teeth are missing between those to be used for abutments.

Goslee's present purpose is to call attention mainly to, and to discuss but one particular form of the many removable attachments now in common use—the *clasp*.

Clasps have been much abused, but Goslee has seen many teeth supporting clasps in which the pulps were still alive after ten years, even though dental caries may have necessitated fillings.

The anatomy of the teeth indicates that clasps are mainly suitable for premolars and molars. The shapes of the crowns in the incisors and canines are usually not favorable to the grasping and self-engaging properties of clasps.

To be successful it is required that a clasp shall (1) possess both inherent strength and resilience; (2) be well adapted to the supporting tooth; (3) must encircle three angles of the circumference of the tooth in order to grasp it firmly and remain in correct position thereon; (4) must be provided with some form of *occlusal rest* as a means of minimizing abrasive influence and of precluding subsequent settling of the fixture, which would alter its position on the tooth and thus render the clasp useless or perhaps even injurious; (5) must not impinge upon the soft tissues or interfere with occlusion; and (6) it must be securely attached to the supporting structure. It is not clear what Goslee means by the last requirement. If he means the tooth by the "supporting structure," as seems most logical, then it is not obvious wherein this requirement differs from the second, third, and fourth. If by "supporting structure" he means the base of the prosthetic appliance, it is strange that he does not take exception, in the discussion which followed his paper, to the idea of movable clasps.

The occlusal rest is an essential part of a clasp in all cases and at all times. The type of clasp which Goslee has found to be most useful and least injurious to the supporting tooth is made in the form of a double loop of 17- or 18-gage round iridio-platinum or high-fusing clasp-metal wire. This wire is adapted and adjusted to a fusible metal model of the tooth. When this has been accomplished, the clasps are properly fitted in the mouth, and then, and not until then, the

full impression, with the clasps in position on the teeth, should be taken in plaster, and the model made. Thus the original model will have the clasps, the form and shape of which are not to be subsequently altered, in position upon it. The base of the denture may now be made in metal or vulcanite. The attachment of the clasp to the base is an extremely important consideration, and must be done so as to secure adequate strength, and at the same time permit of an unrestricted freedom in the springiness of both ends of the clasp.

The discussion which followed the reading of Goslee's paper is thoroughly practical. It is particularly interesting because it developed a subject which has not as yet received general recognition, viz, the desirability of allowing some freedom of motion between the prosthetic appliance on the one hand and the abutment on the other. Norman Essig described a considerable number of movable clasps, designed to accomplish this purpose. His technique cannot be abbreviated, and should be consulted in the original, where clear drawings facilitate one's grasping his ideas. Ottolengui described a movable clasp, which is attached to the base by means of an oval upright post and an oval tube, in place of the round upright post and round tube mentioned by Essig. The oval nature of the post and tube permits sufficient play without allowing the clasps to get out of alignment when removing and replacing the piece.

The central thought of Gormsen's paper is the desirability of allowing some freedom of motion between the prosthetic appliance and the abutment.

He introduces the term *mobile* bridges, because it expresses the thought that bridges should have a certain mobility, so that their abutments may not be strained more than is absolutely necessary. He emphasizes that mobile, not merely removable bridge work, is in every case to be preferred to fixed work. Gormsen's appliances are not to be mobile to the extent that their mobility is noticeable to the patient, or that the bridge should fall off. At this time we can note that partial dentures well meet this requirement of mobility.

Most of the existing systems for removable bridges can readily be adapted to meet Gormsen's requirement. He personally is attached to Peeso's method. In this form of bridge, the mobility can easily be produced when the bridge is finished, by grinding or polishing the telescope caps and split pins so much that they become very loose, so loose that when one has the inner cap of the telescope crown in the bridge, it can be pushed off with a touch of the hand. It is absolutely essential that the abutments be exactly parallel, otherwise the desired mobility cannot be obtained. Gormsen believes that by his method one can make use of abutments which ordinarily would be considered too weak to bear their load. This principle he illustrates by reference to cases in practice.

[*La Stomatologia*, Milano, March 1918.]

Note upon Mottled Teeth. By Piergili.

This note was called forth by the elaborate studies of Black and McKay in the Dental Cosmos for February, May, June, July, and August 1916. To these authors the etiology apparently was most obscure, although there was some evidence that there was some correlation, more than pure coincidence, between the pathological condition and the drinking-water supply.

Piergili quite positively advances his views. The qualitative chemical analysis of the water gives no result, but the quantitative analysis has revealed a common characteristic in the waters of the regions wherein this dental lesion is endemic; a minimum content of mineral salts in general, and of the salts of calcium in particular. This minimum content of calcium salts is the cause of the condition which produces mottled teeth. Chemically, water with its dissolved carbon dioxid has affinity for calcium carbonate. Unless this affinity be satisfied before the water be taken into the mouth, it will (unless the teeth have reached a certain maturity of hardness) dissolve out from the teeth this latter salt.

[*Journal of the California State Dental Association*, San Francisco, March and April, 1918.]

An Investigation of the Methods of Disinfection Carried Out in Dental Offices. By Adah Roberta Holmes.

This extensive and voluminous report comprises one of the most valuable contributions to the subject. The objects of the author

were (1) to point out the dangers of careless methods of disinfection; (2) to demonstrate positively that such methods are at present practiced by many of the profession, and hence the pressing need for their remedy; and (3) when in any way possible, to recommend a standard inexpensive and efficient technique for dental offices.

In reality the paper is an elaborate compilation of data furnished by seventy questionnaires, supplemented to a relatively small extent by personal visits to dental offices. The first two objects may be accepted as unquestionably attained, although some of the remarks would lead one to conclude that the writer is more or less unfamiliar with the exigencies of dental practice. The third object, which is urgently needed, is left for report at some future time. This must be waited for with great interest. We must not forget that such a ponderous, laborious, and minute statement as this present report is of great worth as a logical and necessary prerequisite to the future report, of immediately practical bearing, on the standardization of an inexpensive and efficient technique for dental offices.

[*Lancet*, London, March 30, 1918.]

On Bone-Grafting in Gunshot Wounds of the Mandible. By Harry Platt, George G. Campion, and Barron J. Rodway.

During the past two years more than 500 cases of injuries of the lower jaw have been under treatment in the hospital at which the authors are stationed. The operation of bone-grafting has been performed nine times out of this number. They have found that two distinct types of fracture exist in which the autogeneous bone-graft can be used—(*a*) where there has been a considerable loss of bony tissue with a resulting gap, and (*b*) where with comparatively close apposition of the fragments an unstable fibrous union has developed in spite of long-continued fixation by splints. In (*a*) the function of the graft is to restore continuity; in (*b*) to bridge over the small gap entailed in any refreshening operation (a refreshening of the healed bone ends). The authors briefly describe eight of their cases. They used grafts from rib, scapula, and tibia, prefering the rib. In fixing the graft, they carefully avoided all foreign materials. Where it has been possible they maintained immobility by splintage for some time after the operation. The Claude Martin flange-splint has proved of great value, especially where the smaller fragment is edentulous. The 11 roentgenograms which accompany this article demonstrate the mechanical and physiological functions of the graft.

[*Journal of the American Medical Association*, April 13, 1918.]

The Treatment of Cancer of the Lip by Radium: A Report of Twenty-four Cases. By Henry H. Janeway.

This brief summary, the result of much work, is both concise and convincing. Epithelioma of the lip offers favorable conditions for successful treatment, whether by operation or by radium, more frequently than the majority of other forms of epidermoid carcinoma. The reason for this is, not because of less malignant tendencies, but rather because of the exposed position of cancer of the lip. Janeway concludes that the degree of success obtained in the treatment of operable cancer of the lip by radium in the series of cases here reported, and the maintenance to date with such regularity of the healed condition in the earlier cases treated, justifies a continuation of the use of radium in operable cancer of the lip. He recommends the application of radium emanation embedded in molds of dental compound, and filtered through the thinnest material, for the most superficial lesions. The use of emanation instead of radium element facilitates uniform distribution over the lesion, and provision for uniform distribution is the most important factor in obtaining a successful result. The superior adaptability of radium emanation for the treatment of cancer makes the use of the element itself obsolete, and for the vast majority of cancers it is inefficient.

[*La Restauration Maxillo-faciale*, Paris, Février 1918.]

Ionization Applied to the Treatment of Facial Cicatrices. By Hollande.

Hollande employs a constant current of 220 volts. The strength of the current should be very weak—10 m.a. The passage of the solution of the electrolyte produces its effect upon the cicatricial tissues in proportion to the weakness of the current. He uses potassium

iodid (KI) 1 part in 100 parts of distilled water.

The electrode is generally 5 by 4 cm. Nevertheless its dimension varies according to the extent of the scar. For the face, the electrodes are very near each other. The negative pole is placed upon the cicatrix to be treated; the positive pole, being the farthest, is generally placed under the chin. The positive pole is saturated with the solution of KI. The sittings are given every day for 20 to 25 minutes, during three weeks at least, or about a month. However, in the case of obstinate cicatrices, it may be necessary to prolong this treatment during many months before obtaining appreciable results.

Hollande gives the following conclusions: (1) The influence of KI plays a certain rôle in the softening of cicatricial tissue; the scar progressively loses its peculiar characters—color, stiffness, and adherence—and consequently permits the play of the underlying muscles: the circulation resumes its course. (2) Adherence to osseous tissue disappears as well as the trophic disturbances. (3) Ionization renders a real service to the surgeon for the repair of scars already freed from the subjacent tissues.

[*American Journal of Surgery*, April 1918. Quarterly Supplement of Anesthesia and Analgesia.]

Changes Produced in the Blood by Nitrous Oxid-Oxygen Anesthesia. By Theodore D. Casto.

This is an extension of the researches reported in the Dental Cosmos, vol. lvii, 1915, p. 881; also vol. lix, 1917, p. 415. The animals used in the present series of experiments were albino rats (*Mus norvegicus*, var. *albinus*). The erythrocytes were decreased in number after anesthetization with nitrous oxid and oxygen for from thirty minutes to one hour, the maximum decrease in the twenty animals studied being 70 per cent., the minimum 1 per cent., with an average of 25 per cent. The leucocytes did not show any change in actual number that was constant throughout the series of experiments. A differential count, however, showed a marked tendency on the part of the polymorphonuclear neutrophiles to decrease and of the lymphocytes to increase. The hydrogen-ion concentration of the blood was slightly greater in anesthesia than under normal conditions. The alkali reserve of the blood was depleted during anesthesia. This decrease was comparable to that of a mild acidosis in man. Histological preparations were made to determine the rôle of the spleen in the blood changes under anesthesia. In general, it may be said that no evidence was developed to show any profound or even slight pathological conditions existing. There appear to be no radical changes which take place in the tissue of the splenic pulps, the cells, nor in the Malpighian corpuscles of the spleens of those rats which were given a continuous dose of nitrous oxid-oxygen until death supervened.

[*Lancet*, London, April 13, 1918.]

Unilateral Hypertrophy of the Mandible. By H. P. Pickerill.

Pickerill has had 3 cases of (apparent) unilateral hypertrophy of the mandible resulting from gunshot wounds. In all 3 cases the injury has been a small piece of shrapnel (about the size of a pea) lodged in the pterygo-maxillary fossa. In none of these cases has there been any sign whatever of infection—the wounds have healed by "first intention." There has been no pain, no paralysis, no anesthesia, no fracture, practically no loss of function, and X-ray examination has in each case been negative. Yet in each case there has been an obviously increasing asymmetry of the face, the chin deviated away from the side of the lesion, and there was marked bulging both above and below the zygoma. The only "positive" sign has been a slight hyperemia of the side of the lesion. Pickerill attributes the asymmetry to vasomotor disturbance due to injury in the pterygo-maxillary fossa, and in one of the cases there was evidence of a deep hematoma due to wounding of the internal maxillary artery.

This note was called forth by a case of the same title recorded by William Edmond in the March 30, 1918, *Lancet*. In Edmond's case there was no history of injury, and the pathogenesis was entirely obscure.

PERISCOPE

Matrix.—A celluloid strip cut to shape, with two holes punched at the ends, and held in place by the ivory matrix retainer, makes a very good substitute for the metal band. One has the advantage of watching the cervical margin also.—R. McCLINTON, *Commonwealth Dental Review.*

To Remove Mercury Stain From Gold Crown.—If you chance to have your gold crown or bridge discolored by coming in contact with mercury before being cemented to place, heat it to drive off the mercury, and, if necessary, restore the polish with your finest abrasive.—O. V. CALKINS, *Dental Review.*

After-pain Following Operation.—There is one preparation which will give great satisfaction, and that is a solution of guaiacyl and glycerin. This has been found to be the best preparation for the relief of pain. Orthoform is of service also, but guaiacyl and glycerin in equal parts is an almost unfailing agent for the prevention of after-pain. —L. M. S. MINER, *Journ. N. D. A.*

Die and Counter-die for Swaging Saddles.—After making an impression, take Melotte's moldine, place it around where you want your saddles, and flow it up with Melotte's metal, thereby working your counter-die first; repeat the process with your moldine and make your die in the same manner. Allow this to cool and your gold saddle can be swaged out immediately.—*Minneapolis District Dental Journal.*

Bismuth-Iodoform-Paraffin Paste.—Bismuth-iodoform-paraffin paste, or "bipp," as it is called, has now many advocates. Its use in wound treatment has spread considerably during the year. The paste consists of bismuth subnitrate 1 part, iodoform 2 parts, liquid paraffin 1 part, and it is applied freely to the wound, which is entirely filled with the paste and dressed, with sterile gauze. In preparing "bipp" great care must be taken to insure freedom from grit.—*Amer. Journ. of Pharmacy.*

Lysol.—Lysol is a brown, oily looking, clear liquid, with a creasote-like odor. It is made by dissolving the fraction of tar oil which boils between 190° C. and 200° C. in fat, and subsequent saponifying by the addition of alkali in the presence of alcohol. It contains 50 per cent. cresol, is miscible in water, forming a clear, frothy liquid. It is a more powerful germicide than phenol.—ADAH ROBERTA HOLMES, *Journ. Calif. State Dental Association.*

To Desensitize Teeth that Are Sensitive to Scaling.—Dry the sensitive part thoroughly. Apply for four or five minutes a hot saturated solution of potassium carbonate in glycerin on a pellet of cotton. Dry the part with warm air. Repeat the application, leaving the cotton in place until the patient notices a burning sensation in the tooth, when the scaling may be continued painlessly. This solution will not cause discoloration.—A. DE VRIES, *Dental Review.*

To Clean a Blocked Hypodermic Needle. —To unblock long hypodermic needles, screw the needles on the syringe tightly, put distilled water in the barrel, hold the needle in the flame, and apply pressure with the piston. Steam is thus created in the immediate vicinity of the flame, which exerts pressure sufficient to unblock the needle. Bear in mind that passing through the flame removes the temper, and care should be taken in its use.—H. M. HALPERON, *Dental Review.*

Large Amalgam Fillings in Doubtful Teeth.—Sometimes it is expedient to provide for the possibility of having to remove the filling to obtain re-access to canals, and yet to provide a hard filling, or at any rate a filling hard on the surface. The difficulty is met by filling the bulk of the cavity with an amalgam in which tin predominates, and covering with an amalgam in which silver predominates. This filling will be as useful as an all-hard filling, but if it has to be removed it will be easy to do so after having cut through the casing of hard amalgam.—HUGH PATERSON, *Commonwealth Dental Review.*

Centrifugal Casting.—After about eight years' experience with various forms of casting apparatus, I have come to the following conclusions: (1) That the casting process is invaluable in the case of inlays, crowns, or anything resting on a hard surface which does not yield to pressure; (2) it is of distinct value in difficult lowers; (3) a swaged plate is best in the average upper case; it is more resilient, stronger, and takes a higher finish.

All the different forms of casting apparatus will give good results. The centrifugal force, acting as it does simultaneously on every atom of the molten metal and drawing it into the cast, seems ideal in theory; in practice, however, the other methods give equal results.—COLIN KEAY, *Brit. Dental Journal.*

Casting Dummies for Bridge Work.—It is rather difficult to carve a wax pattern for a dummy, and also extravagant to use 24-k. gold in order to get a solid gold tooth that will not discolor in the mouth. My method to overcome these two points is as follows: Select a facing or porcelain tooth the exact shape and size required to fill the space. Run a die and counter-die in Melotte's metal, using the selected porcelain tooth as a pattern, and strike up a shell with 24-k. or sovereign gold. Trim this shell to fit the model. Now solder a small clip as a retaining point inside the shell and fill with wax; replace on the model, and carve away all surplus wax. Place a sprue into the thickest part of the wax, invest, and cast with scrap or inferior quality gold. This will give a solid dummy, and one which will not discolor where exposed to view.—*Commonwealth Dental Review.*

Unsterilized Root-canal Instruments.—It is almost inconceivable that for years dentists, dental surgeons, if you please, should have strayed so far from basic principles that they should overlook the danger of plunging a barbed broach into a vital pulp unless that broach has previously been sterilized. The same thing applies to all other instruments used in root-canal operations, and yet you and I know that up to within the past four or five years sterilization of our fine root-canal instruments was not a process in general use. These instruments may be sterilized in various ways. One simple method is by employing the Halverson sterilizer. Have the water boiling; the instruments, on a small tray which comes with the sterilizer, are put in the water, and from there are placed in the warm air chamber, and quickly dried.—ELMER S. BEST, *Minneapolis District Dental Journal.*

Making a Plate Prior to Extraction.—I saw something in your "Hints" column about making plates before extractions. I have taken an impression for an upper, and cut off five fronts and three bicuspids on the plaster model, and made the vulcanite plate with the eight teeth on, then extracted the teeth and put the plate in right away, and the patient was very pleased.

I find it a good plan when there are many teeth to extract and the patient has not worn a plate, to extract the bicuspids and molars, make a plate with the posterior teeth, and let the patient wear it for a few weeks; then take an impression with the plate in, cut off the plaster fronts and add to the plate before extracting the anteriors, and let the patient use it as a temporary plate until the gums shrink. This acts well with a lower plate also.—C. PATERSON, *Commonwealth Dental Review.*

Advantages of Phenol-sulfonic Acid.—The consistence of this agent is thick and syrupy, rather oleaginous in character, in the 80 per cent. strength which is recommended; thus a drop will adhere to the end of a broach or other applicator, permitting it to be carried even into the canals of upper teeth without difficulty. The acid does not materially affect a broach, and if any of it accidentally gets on the enamel of the crown of the tooth and is not noticed for a time, it does not decalcify and whiten the spot to the extent that sulfuric acid would do. When the acid is worked through the end of the root, as is desirable for cauterization in cases of a dental granuloma or alveolar abscess, it is sufficiently cauterant for the purpose desired, yet not as destructive as sulfuric acid would be, and owing to its analgesic tendencies it causes less pericementitis. In this connection, however, I want to say that we should not expect to do this work as it must be done, without more or less soreness following the treatment. There is a wide variance in patients regarding the reaction of the periapical tissue to these agents, and in these chronic conditions it is generally best to invite and create inflammatory reaction, that the sluggish cells in the area may take on new life and activity. This should not be done, however, at the expense of unnecessary destruction of tissue.—J. P. BUCKLEY, *Journ. N. D. A.*

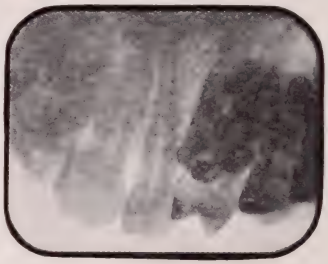
Anilin Dye as a Germicide.—The following method of preparation and application has been used with much success in my practice for the past year, in treating chronic abscess and pyorrhea. Make a solution in the proportion of about half a grain of anilin violet (methyl-violet B) to one dram of distilled water. Inject a small quantity of the solution into the fistulous opening of the abscess, with a blunt-pointed syringe. The syringe should have a glass barrel, and the point be of either gold or platinum. The abscess should be treated surgically first. If necessary it should be curetted, or in a case of root-excision the parts should first be properly cared-for. The anilin solution should be used three or four times at intervals of every other day. It may be applied with cotton twisted on a broach. In severe chronic cases or in pyorrhea pockets a small pledget of cotton may be saturated and pressed into the orifice and left for twenty-four hours. The anilin treatment may be followed with bismuth paste as a final dressing. In using anilin dye it is necessary to use some care on account only of the color, as there is absolutely no danger from the stain on the lips or tongue. Besides, the stain can readily be removed with absorbent cotton and water.—Geo. D. Sitherwood, *Dental Review.*

Sterilization of Instruments.—The problem before dentists at the present time in the transmission of disease-producing organisms is the same great problem that has been so well attacked and overcome in general surgery against wound infections since the revolutionary teachings of Lister. Surgeons have been forced to improve their methods from the fact that an infected instrument introduced into a wound or the field of operation produces an infection which has frequently been traced directly to the use of such unsterile instruments or faulty technique. On the other hand, when a patient receives the causative agent of disease from an unclean dental instrument, he does not know the disease was acquired in this manner; the dentist does not know it, in fact probably does not even know of the presence of the disease-producing organisms. There is no way of absolutely tracing infections contracted in a dental office; therefore, for his carelessness the accusing hand does not always point directly at the dentist as with the surgeon.

The knowledge of asepsis in surgery, and of bacteriological expert laboratory controls, must be the spur to advance along these lines, and so there must be developed in each one an antiseptic technique, and an "antiseptic conscience."—Adah Roberta Holmes, *Journ. Calif. State Dental Association.*

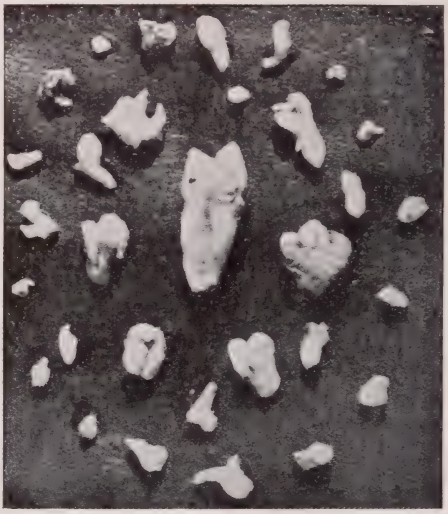
Removal of Thirty Denticles From One Bicuspid Socket.—On May 29, 1917, a woman, age twenty-three, called my attention to a slight prominence of the gum buccally

Fig. 1.



Collection of denticles in upper right bicuspid region.

Fig. 2.



The thirty denticles removed from the bicuspid socket.

to the upper right bicuspid region, which had not produced any symptoms other than the elevation of the tissue.

Fig. 1 is a roentgenogram of the upper right bicuspid region showing the presence of a collection of denticles. The patient was referred to Dr. John Voss of Iowa City, Iowa, who extracted thirty denticles (shown in Fig. 2) from the first bicuspid socket. All teeth were present, and occlusion was perfect, excepting the third molars, which had not erupted.—Bundy Allen, M.D., *Journ. A. M. A.*

Treatment of Oral Sepsis.—In my opinion, the original focus of the severer types of oral sepsis is at the margin of the gums and teeth. Mastication forces food in between the teeth, and between the gums and teeth. This food sets up a certain amount of irritation, and forms a suitable nidus for various organisms. The first problem is how to prevent food lodging in these sites; this can be solved only by efficient cleansing with a brush, which must be fairly stiff, and used after each meal in conjunction with a powder. I have found the following excellent: Magnesiæ carb. pond. 3 parts; sulf. sublim., sapo castil., āā 1 part; ol. menth. pip. q. s. If gingivitis or pyorrhea has already commenced, the affected area should be firmly swabbed with a small, tightly rolled pledget of wool held in a pincet and dipped in liq. cresol saponis or any of its substitutes, taking care to remove the excess before using. A tumbler of warm water and spittoon should be ready to use immediately after. The thymol mouthwash should be prescribed. This method, I venture to predict, will come as a revelation to all who have labored for weeks and months with iodin, hydrogen dioxid, and other methods, as it is so rapid in its effects; only in very advanced cases have I found it necessary to apply the liq. cresol saponis twice, and rarely three times, at two-day intervals.—N. C. Fischer, *Brit. Journ. Dental Science.*

Paraffin Treatment of Burns.—The use of a French proprietary called ambrine was announced comparatively early in the war. Ambrine is a preparation of hard paraffin, containing, some say, resin and oil of amber. When melted and applied to burns or wounds, it forms an airtight coating, under which the lesion rapidly and completely heals. Its success was undoubted, and it was not long before investigations were afoot with a view to ascertain the rationale of its action, and if possible, to discover an effective and inexpensive substitute for use on a large scale. Ordinary paraffin was not sufficiently plastic when applied to the skin, and attempts to mix resin with it failed, owing to separation of the resin when the mixture was heated. It was found, however, that when hard paraffin was heated to 130° C. by means of superheated steam, some molecular change took place. The melting-point was reduced several degrees, and the substance took on properties similar to ambrine. This paraffin, with the addition of certain antiseptics, is known officially as "No. 7 Paraffin," and its formula is—Resorcin, 1 part (or beta-naphthol, 0.25); oil of eucalyptus, 2; olive oil, 5; hard paraffin, 67; soft paraffin, 25. The method of application is as follows: The burn is washed with sterile water, and carefully dried; a layer of melted paraffin is then painted on, and covered with a thin layer of cotton; a second layer of melted paraffin is applied over that, and the whole covered with wool and a bandage. The dressing is changed daily at first, later every second day.—*Amer. Journ. of Pharmacy.*

A New Thought About Making Plaster Models.—Making plaster models that are exact and perfect duplicates of the parts involved, and at the same time strong and substantial, with the thin ends and angles of the teeth reproduced absolutely perfectly and of sufficient strength, and securing a model of isolated teeth standing alone at some distance from neighboring teeth, with such strength that they will not break off from the model when separating, or subsequently while working on the case, is often fraught with sore trials and disappointments, because dental plaster does not possess the desired edge and angle strength, nor sufficient strength to sustain a model of a slender tooth standing alone in many cases. The following described method will enable you to make a model possessing all the desired qualifications suggested above: Before filling the impression with plaster fill the portions of the impression in which you desire strength and accuracy with synthetic porcelain, or Aschers artificial enamel, or a good quality of dental cement, and while it is soft and plastic insert a piece of copper wire or staple of the required gage to give strength, leaving the staples protruding from the porcelain, enamel, or cement, whichever you use. When hardened fill up the impression with plaster so that the protruding staples will be embedded in the plaster, thus holding all parts of the model firmly together. Upon separating the case you will find the thin edges and angles of the teeth perfectly reproduced and strong, and the isolated teeth of the model firm and strong also.—H. A. Cross, *Dental Review.*

OBITUARY

Dr. Alvin Richard Eaton.

[See Frontispiece.]

Died, Tuesday, April 9, 1918, in his seventy-ninth year, at his home in Elizabeth, N. J., after an illness of several months, Alvin Richard Eaton, D.D.S.

Dr. Eaton, the son of Edwin D. and Harriott (Litchfield) Eaton, was born in Whitehall, N. Y., March 19, 1840, where he received his preliminary education in the public schools of that city, later attending the Columbia Grammar School in New York and a private academy at Keyport, N. Y.

While still a young man, Dr. Eaton removed to MacGregor, Iowa, in which place he was engaged in business for a number of years. In 1862 Dr. Eaton returned to the East, and having determined to take up the study of dentistry, entered the office of Dr. Pretere. After completing his studies under Dr. Pretere, he returned to Whitehall, N. Y., and there began the practice of dentistry.

In 1872 Dr. Eaton removed to Elizabeth, N. J., and associated himself with the late Dr. A. W. Kingsley, which partnership continued until Dr. Kingsley retired, after which Dr. Eaton continued the practice thus established until February 1917, when he also retired from active practice. In 1888 Dr. Eaton entered the Baltimore College of Dental Surgery, from which institution he received his D.D.S. degree.

Dr. Eaton was a charter member of the Dental Society of the State of New York; a member of the New Jersey State Dental Society, serving as its president in 1886; a member of the Central Dental Association of Northern New Jersey, and also served as president of this society in 1890; an associate member of the New York Institute of Stomatology; member of the American Academy of Dental Surgery of New Jersey, serving as its treasurer in 1886; a member of the New York Odontological Society; was first president of the New Jersey State Board of Registration and Examination, of which he was a member for many years, and in the work of which he took an enthusiastic interest.

Dr. Eaton was largely instrumental in founding the Free Dental Clinic for school children in New Jersey, and was the treasurer of the free dental clinic of Elizabeth until the time of his retirement from active practice.

Dr. Eaton was a member of the Masonic Lodge of Whitehall, N. Y. He was the first president of the Suburban Club of Elizabeth and also a member of the Mattano Club and the Elizabeth Club as well as of the Elizabeth Town and Country Club. He was a member and communicant of St. John's Episcopal Church of Elizabeth.

On the occasion of the fiftieth anniversary of his entrance into the practice of dentistry, March 18, 1911, the Dental Society of the State of New York and the New Jersey Dental Society tendered to Dr. Eaton a complimentary dinner at the New York Athletic Club, New York City. On this occasion Dr. C. S. Hardy, a lifelong friend of Dr. Eaton, paid to him the following tribute:

This dinner is given to our guest, not only that we may in this way pay tribute to his seventy-first birthday and the beginning of his fiftieth year of practice, but to show our appreciation of the high quality of work he has done through these his many years of labor as a practical dentist. To pay homage to the stalwart figure of more than threescore and ten that contains such a noble man, retiring and unostentatious, yet a man among men, bearing malice toward none and with charity to all; who has reaped his harvest, and blended harmoniously his own atmosphere —who has sown the seeds of kindness and

encouragement, alike amid adversity and prosperity, and like the weathered oak has stood the test of time and gale, thus individually increasing the flow of that eternal stream of progress which by its gradual refinement has added to the world's culture and enterprise.

Such men we should all emulate. The power of his example will live long, and its influence will be felt beyond a generation—fortunate indeed are those who can so pattern after him.

Dr. Eaton was married on June 29, 1863, to Miss Katharine Jane O'Reilly of Whitehall, N. Y. Dr. Eaton is survived by two sons, Capt. Robert L. Eaton and Dr. Alvin R. Eaton, Jr., of this city.

The members of the Union County Dental Society wish publicly to express their sorrow at the death of their friend and associate, Dr. Alvin R. Eaton of Elizabeth, N. J., and to that end have passed the following resolutions:

Resolved, That in his death we feel the loss of a valued and esteemed member, who always stood for the highest there is in dentistry; and be it

Resolved, That the warmest sympathy be extended to his family in their great bereavement; and be it further

Resolved, That a copy of these resolutions be spread upon the minutes of this society, and that a copy be sent to the various dental journals.

A. P. Roberts,
Oscar Adelberg,
Committee.

Dr. Rufus W. Carroll.

Died, Friday, April 26, 1918, at his home in Beaumont, Texas, in his fifty-third year, Rufus W. Carroll, D.D.S.

In the death of Dr. Carroll his community and state lost a good citizen and the dental profession a man of sterling qualities, who ever upheld its highest traditions.

Dr. Carroll was born in Natchitoches Parish, La., in 1865. He came to Texas in 1883, and was actively engaged in the practice of his profession in Beaumont for thirty years.

After graduating from Baylor University at Waco, Texas, Dr. Carroll entered the Dental Department of Vanderbilt University, Nashville, Tenn., where he received the dental degree in 1888. In that same year he was married to Miss Lutie Banks Armstrong of Nashville, Tenn.

Dr. Carroll was a member of the Texas Dental Society, the National Dental Association, and of the old Southern Dental Association until it merged with the National. He was an active worker and served on many committees. For a number of years he was chairman of the board of censors of his state society, of which at the time of his death he was first vice-president. He was a member of the Woodmen of the World, and of the First Baptist Church of Beaumont.

During his long practice in Beaumont, Dr. Carroll by his exemplary life and earnest work gathered about him a host of friends, and his death caused sorrow in many homes in Jefferson county, as well as in other sections where he was known.

Dr. Carroll is survived by his wife and six children.

J. E. Storey.

"In Memoriam" Resolutions.

Dr. Isaac H. Davis.

The following *in memoriam* resolutions on the death of Dr. I. H. Davis were adopted by the Maryland State Dental Association at its February 1918 meeting:

Whereas, an all-wise Providence in His infinite wisdom has taken from our midst through death one of our highly esteemed and well-beloved members, Dr. Isaac H. Davis; and

Whereas, his life, work, and association have been an example and stimulus to the many who knew him well and were privileged to come under his influence; and

Whereas, his usefulness as a citizen, teacher, practitioner, and member of this body

has ever been strikingly commendable in every respect; therefore be it

RESOLVED, by the Maryland State Dental Association, that its membership keenly feels the loss sustained through his demise, and hereby gives expression to its sincere sympathy with his family in their period of sadness; and be it further

RESOLVED, That we, individually and collectively, heartily attest to his nobility of character, his ideal life, his professional skill and peculiar tactfulness, his gentle and cheerful spirit, his bighearted and genuine interest in human uplift, which qualities deservedly endeared him to a multitude of friends; and be it further

RESOLVED, That by the death of Isaac H. Davis the state has lost a valuable citizen, the school with which he was long associated a successful and conscientious teacher, the profession of dentistry an energetic, ethical, and worthy representative, and this body a devoted, loyal, and helpful member; and be it further

RESOLVED, That a copy of these resolutions be forwarded to his widow.

F. F. DREW, *Corr. Sec'y.*

Dr. John H. London.

THE following resolutions upon the death of Dr. John H. London were adopted by the District of Columbia Dental Society, March 19, 1918.

Whereas, the Supreme Master in His wisdom has seen fit to remove from us Dr. John H. London, for many years an esteemed member of his chosen profession, it is fitting that we should make a record of his death, and express our sorrow over the untimely close of his career; and

Whereas, his exceptional interest in his profession and his beautiful character endeared him and made him lovable to all who knew him; therefore be it

RESOLVED, That we, the members of the District of Columbia Dental Society, feeling deeply our loss, hereby express our appreciation of his friendship; and be it further

RESOLVED, That these resolutions be spread upon the minutes of the society, published in the DENTAL COSMOS, and that a copy be sent to the widow.

CHESTER A. BAKER,
THOS. L. RUST,
ALLAN S. WOLFE,
Committee.

Dental College Commencements

University of Pittsburgh School of Dentistry.

The annual commencement exercises of the University of Pittsburgh, School of dentistry, were held in Pittsburgh, Pa., on Friday, May 31, 1918.

The degree of Doctor of Dental Surgery was conferred on the following graduates:

Percival W. Allen
Edgar LeR. Ambrose
Park R. Ashbrook
Elmer E. Atkinson
John LaV. Barton
Ralph A. Bastress
Courtney O. Bischoff
David M. Boies
John L. Boots
Ernest M. Breed
Howard F. Bristol
George L. Cavanagh
Edwin B. Clark
Charles W. Conn
Edwin S. Coombe
Harold M. Covert
William E. Craig
Alpheus J. Cross
Paul H. Deffenbaugh
Ernest P. De Haas
Foster L. De Hart
Morris W. De Hart
Samuel W. Diller, Jr.
Louis I. Diss
Edwin B. Fast
Harry E. Fetters
Albert L. Finlay
J. Emory Franklin
John E. Gestner
Lester Goldstein
Russell S. Halpin
Fonza E. Hamilton
Earl F. Hartley
Raymond A. Hayes
John A. Helfenbine
Frederick E. Henry
George A. Hoop
Robert K. Igo
Stewart M. Johnson
Charles A. Johnston
Stanley L. Kalinowski
Robert Kaplan
William P. Kennedy
William A. Kern
Otto Kesel
Frederick L. W. Kuhlman
Isador Levy
Arthur C. Lindberg
Raymond C. Lutz
Frank M. McCarthy
William D. McClelland
Harold D. Minerd
John W. Mitchell
Harold W. Moore
Foyd L. Morse
James V. O'Donovan
Francis J. Owens
Lawrence H. Peterson
John C. Pillow
Lawrence B. Riggs
Chester A. Robinson
Charles W. Rogers
Samuel H. Rosenthal
Edward B. Rotheram
James W. Scott
Edward D. Shumaker
John W. Sigafoos
Martin Snyderman
Bert C. Sproull
Howard M. Steele
Joseph I. Steele
Charles S. Stitt
Harry H. Stoops
James E. Stuart
John B. Sutherland
Roland M. Swank
Thomas M. Taylor
Paul N. Teare
Loyal B. Thomas
John A. Thompson
Van Burchfield Weber
Lloyd E. Weekley
Howard E. White
Daniel L. Young

George Washington University Dental School.

The ninety-seventh annual commencement exercises of George Washington University Dental School were held in Washington, D. C., on June 5, 1918.

Addresses were delivered by Joseph S. Auerbach, A.M., LL.B., and by President Stockton.

The degree of Doctor of Dental Surgery was conferred on the following graduates:

Ralph W. S. Bonnett ... Ohio
Eugenia Butkiewicz .... District of Columbia
Elmer E. Christiansen .. Utah
John B. Copping ..... Maryland
Earl F. Danforth ..... District of Columbia
Hilmer A. Erickson .... Minnesota
Abraham J. Fainman ... Russia
George A. Flanagan .... New York
William Keroes ..... District of Columbia
Henry C. Lowry ..... Michigan
Oscar L. Manley ..... Missouri
Hymen Popkin ..... New Jersey
Arma E. Rush ..... District of Columbia
Gunichi Shibata ..... Japan
William M. Sweet ..... District of Columbia
Herman H. Vordermark .. South Dakota
Eugene LeR. Walter .... District of Columbia

Kansas City Dental College.

THE thirty-seventh annual commencement exercises of Kansas City Dental College were held in Kansas City, Mo., on May 25, 1918.

An address was delivered by Rev. Samuel D. Harkness.

The degree of Doctor of Dental Surgery was conferred by Dr. John D. Patterson on the following graduates:

Blythe R. Adams
Clarence A. Anderson
William R. Brown
Floyd W. Buchanan
Charles L. Buckner
Alonzo E. Casè
Walter E. Casey
Arthur B. Chalmers
John A. Corman
Claude A. Crabb
Joseph D. Crowder
Herbert M. Culver
Craig J. Cundiff
Lester C. Eberhart
Frederick C. Elliott
William H. Euler
Irvin S. Evans
Raymond L. Fox
Hobart S. Fulton
Milton P. Gardner
Frederick M. Garrett
Arthur H. Gilfillan
Louis H. Gilley
Lewers D. Gray
Leroy Hamilton
Swan C. Hamilton
Maurice Hardenbrook
Lester B. Hill
Paul B. Hoffmann
Ernest G. Husband
Rolla B. Ingram
Frederick M. Jamar
Rexford E. Jacques
Joseph B. Jenkins
Robert D. Jordan
Clarence G. Kehl
Herbert LeR. Kells
Thomas P. Keyes
Leon R. Kramer
Raymond O. Lane
Eugene H. Lentz
George H. Lewis
William T. Longwell
Albert W. Lyon
Joseph F. McCarty
Charles M. McCue
John R. McDonald
Erle D. McEwen
Van Cubbage Medcalf
Erik Moe
Lester E. Morrow
Charles B. Myers
Ralph A. Olson
Marion S. Otten
John E. O'Donnel
Vernon L. Overstreet
Alan L. Pickard
William M. Pugh
Robert G. Reed
Roy M. Sansom
Lorenzo D. Shain
Franklin A. Smith
Ira T. Stewart
James J. Sullivan
Gordon L. Teall
Dr. Masakazu Wakui
Philip T. Williams
Erle Whitney
Lee F. Whitson

Vanderbilt University School of Dentistry.

THE annual commencement exercises of Vanderbilt University, School of Dentistry, were held in Nashville, Tenn., on May 30, 1918.

An address to the graduates was delivered by Rev. James I. Vance, D.D.

The degree of Doctor of Dental Surgery was conferred by Chancellor James H. Kirkland, A.M., Ph.D., LL.D., on the following graduates:

Robert L. Anderson ..... Tennessee
James C. Austin ..... Illinois
Ed. W. Bacon ..... Texas
John F. Baldwin ..... Kansas
Alfred H. Bartling ..... Missouri
I. William Bull ..... Missouri
Winston P. Caine ..... Mississippi
John W. Campbell ..... Virginia
Jesse R. Carlton ..... Iowa
Mark J. Clark ..... Tennessee
Ray Cole ..... Georgia
Emile M. Cuenod ..... Texas
Cliffe A. Daniel ..... Tennessee
Carl E. Ellis ..... Kentucky
William T. Foster ..... Mexico
Christine M. Gilbreth ..... Tennessee
Gordon K. Harmstead ..... Ohio
Hamilton D. Harper ..... Louisiana
Thomas H. Harris, Jr. ..... Arkansas
Maurice S. Howard ..... Tennessee
William H. Howard, Jr. ..... Tennessee
John B. Hurt ..... Tennessee
Abner S. Ingman, Jr. ..... Missouri
Monroe L. Jarrell ..... Louisiana
Albert X. Lawrence ..... North Carolina
Laurence E. Linebaugh ..... Florida
Hubert B. Love ..... Texas
William M. McAnally ..... Oklahoma
Raymond R. McDaniel ..... Alabama
Harry T. McGlothlin ..... Tennessee
Cecil E. Mathis ..... Tennessee
Edward J. Mahoney ..... Arkansas
Malta L. Naramore ..... Alabama
Newton L. Norman ..... Louisiana
William W. Petty ..... West Virginia
James B. Price ..... Mississippi
Rankin J. Redman ..... Kentucky
Charles F. Sowell ..... South Carolina
Van Albert Stilley, Jr. ..... Kentucky
Frank L. Tapia, Jr. ..... Alabama
Eugene H. Taylor ..... Tennessee
Thomas L. Thomas ..... Florida
Francis C. Ulen ..... Indiana
John M. Vick ..... Tennessee
Myrtt Winton ..... Tennessee
Fred R. Woodward ..... Tennessee

Texas Dental College.

THE annual commencement exercises of Texas Dental College were held in Houston, Texas, on Thursday, May 23, 1918.

The degree of Doctor of Dental Surgery was conferred on the following graduates:

Ernest D. Ames	Thomas Corr	Paul Knittel, Jr.	Geston M. Platt
Harris M. H. Ball	Wheeler W. Cunningham	Nathan B. McNutt	Jack H. Rabe
Andrew M. Belbeze	Lloid B. Hanson	John M. Manning	Lewis A. Roberts
Ditzler Brookshire	Richard G. Hardy	Walter T. Newton	Max Scholl
Frank J. Brophy	Shirley P. Kennedy	Frank J. Offer	Miss O. D. Sheffield
Milton H. Chandler	Frank L. King	Frank J. O'Rourke	Henry Tiras

---

Baltimore College of Dental Surgery.

AT the annual commencement exercises of Baltimore College of Dental Surgery, held in Baltimore, Md., the degree of Doctor of Dental Surgery was conferred on the following graduates:

E. L. Bailes	West Virginia
H. S. Barnes	West Virginia
C. C. Bell	West Virginia
L. T. Bruyette	Connecticut
E. M. Bullard	Massachusetts
D. A. Burt	New York
O. Carbonneau, Jr.	Massachusetts
H. W. Causland	Maine
S. Z. Cervoni	Porto Rico
H. C. Chang	Honolulu
E. E. Chauvin	New York
H. G. Clements	Virginia
A. J. Cobb	North Carolina
M. F. Cook	Maryland
O. L. Cook	West Virginia
H. J. Cotter	Connecticut
R. D. Crawford	New York
P. J. Cummings	Connecticut
W. E. Cumpston	West Virginia
I. R. Cyr	Maine
P. A. Cyr	Maine
S. M. Damren	Maine
W. M. Davis	West Virginia
J. F. Etheridge	Maryland
E. G. Gail	Maryland
A. H. Gaudet	Canada
W. F. Gear	Newfoundland
H. A. Gettys	New York
E. Gil	Porto Rico
W. E. Grady	Connecticut
F. A. Haughney	Connecticut
W. R. Hawkins	New Jersey
E. F. Heininger	Vermont
F. P. Higgins	Maine
B. J. Houg	Norway
L. W. Houston	Massachusetts
J. W. Keagle	Maryland
L. E. Kelley	Maine
G. L. Killery	Vermont
H. F. Killery	Vermont
W. O. Koon	West Virginia
L. J. Kowalski	Connecticut
M. Lavey	New York
H. J. Lehr	Newfoundland
J. K. Lennox	Pennsylvania
G. R. Lister	Canada
J. M. Loyola	Porto Rico
J. J. McCarthy	Pennsylvania
J. J. McElhinney	New Jersey
S. Miller	New York
G. F. Nettleton	New Hampshire
E. J. O'Day	Massachusetts
J. J. O'Leary	Maryland
B. F. O'Toole	Maryland
L. J. Parmesano	West Virginia
D. R. Parsons	West Virginia
R. H. Perkinson	North Carolina
N. H. Perry	Maryland
D. C. Peters	Virginia
G. W. Poling	West Virginia
C. F. Ponce de Leon	Porto Rico
G. H. Quinn	Connecticut
N. J. Richards	Virginia
S. Rubin	New York
H. Scheer	Maryland
A. J. Schmidiger	Maryland
F. S. Shultz	Virginia
O. D. Shumaker	West Virginia
L. A. Spicer	Maryland
A. B. Stinson	Pennsylvania
J. C. Toole	New Jersey
R. S. Turlington	North Carolina
A. K. Wade	Canada
W. M. Ward	North Carolina
F. Wertheimer	Maryland

DENTAL LEGISLATION
AND
LEGAL DECISIONS.

STATE OF NEW JERSEY.

Law Authorizing the Establishment of Free Dental Clinics in Municipalities.

THERE has recently been enacted in the State of New Jersey a Free Dental Clinic Law, which provides that hereafter municipalities may appropriate public money for the maintenance of free dental clinics for poor children of school age.

The bill was introduced by Mr. Whitney of Morris county, January 21st, was approved by the Committee on Public Health, passed both houses of the Legislature with little or no opposition, and was speedily signed by Governor Edge.

The full text of the law follows:

AN ACT

TO AUTHORIZE ANY MUNICIPALITY IN THIS STATE TO MAKE ANNUAL APPROPRIATIONS FOR THE PURPOSE OF CONDUCTING AND MAINTAINING DENTAL CLINICS IN ANY SUCH MUNICIPALITY, FOR THE FREE TREATMENT OF INDIGENT PERSONS OF SCHOOL AGE.

Be it enacted by the Senate and General Assembly of the State of New Jersey:

IT shall be lawful for any board or body having control of the finances of any municipality, annually to appropriate a sum, as it may deem advisable, to be used and applied only for the maintenance and equipment, in such municipality, of a dental clinic or clinics, for the free treatment of indigent persons of school age.

—*Morris County Press.*

STATE OF NEW YORK.

Oral Hygiene Ordinance for New York City.

THE few dental clinics now operated by the department of Health exist by executive decree, and may be abolished or curtailed by the same act at any time. The purpose of this ordinance is to substitute for this makeshift organization a permanent policy and a constructive program in Oral Hygiene guaranteed by city law.

Be it ordained by the Board of Aldermen of the City of New York, as follows:

SEC. 1. There shall be established a division of Oral Hygiene in the department of Health.

SEC. 2. The purpose of such division shall be to establish and maintain such clinics and other agencies as may be necessary to secure for the children of the public schools adequate prevention and protection from dental deterioration and disease

SEC. 3. The grades of positions within the said division shall be such as may be from time to time determined by the Board of Aldermen upon the recommendation of the Board of Estimate and Apportionment and the Commissioner of Health.

SEC. 4. The said division shall be organized immediately, and upon its organization shall take over and operate the dental clinics now existing under the jurisdiction of the said department of Health.

SEC. 5. The said division shall immediately upon its organization proceed to establish at least nine additional dental clinics in those public schools where the greatest need is found to exist, and shall from time to time continue the establishment of such further clinics as may be found necessary to carry out the provisions of this act.

SEC. 6. The Board of Estimate and Apportionment is hereby requested, pursuant to the provisions of section 188, paragraph 8, of the City Charter, to authorize the issuance of special revenue bonds in the sum of $10,800 to provide for the permanent equipment necessary to establish such nine new clinics, and the further issuance of said bonds to an amount necessary to meet the maintenance costs of such clinics and the salaries of one dentist at the rate of $1020 per year and one dental hygienist at the rate of $960 per year for each such clinic from the time of the passage of this act until January 1, 1919.

[The above ordinance introduced in the Board of Aldermen of New York City should be of special interest to the profession because of the educational value which the clinics will no doubt be to the public.—ED.]

STATE OF MISSOURI.

Negligence Charged in Sterilizing Instruments—Blood Poisoning.

[ABSTRACTED FROM THE RECORDS OF THE ST. LOUIS COURT OF APPEALS.]

THAT it is a very difficult matter to connect negligence on the part of a dentist in not properly sterilizing his instruments with an infection of blood poisoning later developing in a patient's mouth, sufficiently strongly in a court of law to fix liability, is very clearly shown in the case of Nevinger *v.* Haun, recently decided in the St. Louis Court of Appeals (196 S. W. 39), wherein it is reported that—

The plaintiff, Perry Nevinger, a boy of seventeen years, had many teeth which were badly decayed. In company with his mother he went to Dr. Robinson, a St. Louis dentist, for the purpose of getting an estimate as to charges for filling certain teeth and extracting two others. The estimate not being satisfactory, they went on the following day to Dr. B. O. Haun, and the latter undertook to extract one tooth which was so badly decayed that nothing remained of it above the gum. Finding that it would be too painful to extract the tooth using only a local anesthetic, as he at first attempted, he gave the patient the professional card of Dr. Fredericks, who made a specialty of extracting teeth and who used a general anesthetic. Nevinger did not go to Dr. Fredericks until the next day. He testified that while prior to the attempt at extraction by Dr. Haun his teeth had caused him no pain, after leaving Dr. Haun he suffered much pain during the entire night and on the following morning before going to Dr. Fredericks. After the extraction of the tooth by Dr. Fredericks, Nevinger's condition became more serious; the inflammation, swelling, and pain increased, and within a few days it was found that blood poisoning had developed.

In the suit brought by Nevinger against Dr. Haun for damages growing out of the infection there was testimony both ways as to whether the instruments used in the operation were properly sterilized before being used. There was also much testimony as to possible sources of infection in similar cases, aside from the instruments.

Dr. Fredericks testified that many kinds

of bacteria are constantly present in the mouth of the ordinary individual such as are likely to cause infection; that infections are quite common among dentists' patients; and that these are occasioned by bacteria which may be introduced in a great variety of ways, *e.g.* in food, by use of a toothpick, drinking-cup or glass, etc., or from the atmosphere alone.

Dr. Robinson testified that he found the condition of the plaintiff's mouth very bad; that the molars on each side were broken off or had decayed to the level of the gum; that "The gums were in very poor shape, not only around these teeth but around others;" that the plaintiff was complaining of pain at the time, and that "These teeth were infected before anyone touched them." He further testified that in nearly every case where a patient comes to a dentist there is some infection about the mouth, usually not serious, but that it was a very common thing for it to result in blood poisoning.

Dr. Turner, a dentist, testifying for defendant as an expert, said: "Almost everything we touch, almost every kind of utensil, has bacteria on it. Whether they develop or not in a person's mouth is a question of susceptibility and immunity. If the person is in good physical condition, probably they will not develop; but if run down, and there are a large number of bacteria in the mouth, he is likely to have a serious infection."

Dr. Flemming, another expert, who testified for the defendant, stated that it was impossible to thoroughly disinfect the mouth so that it would be surgically clean, "on account of the crevices between the teeth and cavities in the teeth, and the acid condition in most mouths."

Dr. Oatman, a physician, called as an expert, also testified that it was impossible to have the mouth surgically clean; that infection may occur though the instruments used are "absolutely sterile," and that it "happens frequently in spite of all precautions."

In passing upon this testimony, the Court said in part:

"The difficulty with plaintiff's case, as we see it, is a lack of evidence of any substantial character tending in law to show that plaintiff's injuries proximately resulted from defendant's negligence, if any, in failing, if he did, to sterilize his instruments immediately before using them. It is axiomatic in the law of negligence that a causal connection must be established between the injury or loss suffered and the negligence with which the defendant is charged. This need not be shown by direct and positive testimony; it is sufficient if it be made to appear by inference or inferences which may be reasonably and legitimately deduced from the facts and circumstances shown in evidence. But if the evidence, when viewed in the light most favorable to plaintiff, giving him the benefit of all inferences which may be properly drawn in his favor, leaves the matter merely to speculation and conjecture, plaintiff's case must fail; for plaintiff carries the burden of adducing substantial evidence tending to affirmatively establish such casual connection.

"Under the evidence in the record before us, we think that plaintiff failed to carry the burden thus resting upon him. The infection may perhaps have originated from defendant's instruments, but, on the other hand, the opportunity for infection from a great variety of other sources was at least equally great. Testimony for the defendant makes it appear that the infection had its origin prior to the time when defendant undertook to extract plaintiff's tooth. Opposed to this is the mere testimony of plaintiff that he had not suffered pain from his teeth (though Dr. Robinson says that plaintiff came to him because of being in pain therefrom). However this may be, it is undisputed that plaintiff's teeth had been sadly neglected and that many of them were badly decayed. And the evidence shows that even where such conditions are not present the mouth contains many germs likely to cause infection, and that when the teeth are permitted to thus become decayed and rotten the danger therefrom is greatly enhanced; that infection may occur where no instruments are used, originating solely from the condition of the patient and his susceptibility to the ravages of bacteria which are ever present. And aside from this, three dentists used instruments in plaintiff's mouth in as many days.

"When the entire evidence touching the matter is received, it seems quite clear that the showing made is merely that plaintiff's injury was due to some one of several causes, for one of which only could defendant be liable: and that which of these was the *causa causans* is a matter of pure conjecture. Under such circumstances, the authorities agree that no recovery may be had."

Army and Navy Dental News

Increase in the Naval Dental Corps.

Embodied in the naval appropriation bill is a provision for an increase and reorganization of the Naval Dental Corps. The draft of the bill as reported to the Senate appears below in the present issue, but several amendments were made by the Senate at the request of Senator Lodge, who explained that their purpose was to give dental surgeons the grade of dental inspector and the pay and allowances of a captain, but not the rank. It was thought desirable, he said, not to give dental surgeons the rank of captain, for the reason that in a hospital, which must be under the command of a medical officer, it might occur that a dental surgeon holding the rank of captain would outrank the officer of the medical corps in command, and thus place the dental surgeon in charge of the hospital. He said the department took the ground that they (the dental surgeons) ought not to go higher than lieutenant-commander, while members of the dental profession thought they should have the rank of captain; so the committee compromised by fixing the maximum rank to be attained at commander. In the bill as it was presented dental surgeons were given the pay and allowances of commander and captain, but without rank higher than commander. Another amendment, adopted on the floor of the Senate, provides that "All appointments or promotions provided for in this amendment shall be made by and with the advice and consent of the Senate." This amendment is a needless repetition, as the section relating to the dental corps starts with the provision "That the President of the United States is hereby authorized to appoint and commission, by and with the advice and consent of the Senate, dental officers in the navy," etc., and the addition made by the Senate is of doubtful constitutionality, as it apparently takes the appointing power away from the President. The bill provides one dental officer for each thousand of the combined *personnel* of the officers and men of the navy and marine corps, which will increase the present corps by about twenty members, and with the large increase in the navy's complement provided in the pending appropriation bill the corps will be correspondingly enlarged. Members of the present dental corps will have the advantage of receiving credit for promotion for service rendered in an appointed status, as well as under a commission, an advantage which medical officers who served under an acting appointment did not enjoy. (The bill as proposed is printed below.)

Proposed Legislation on the Naval Dental Corps.

The provision amending the act of June 30, 1917, relative to the Dental Corps, follows:

That the President of the United States is hereby authorized to appoint and commission, by and with the advice and consent of the Senate, dental officers in the navy at the rate of one for each thousand of the total authorized number of officers and enlisted men of the navy and marine corps, in the grades of assistant dental surgeon, passed assistant dental surgeon, dental surgeon, and dental inspector, who shall constitute the Naval Dental Corps, and shall be a part of the Medical department of the navy. Original appointments to the naval dental corps shall be made in the grade of assistant dental surgeon with the rank of lieutenant (junior grade), and all dental officers now in the dental corps appointed under the provisions of the act of Congress approved August 22, 1912 (St. at L., vol. 37, p. 345), or under the provisions of the act of Congress approved August 29, 1916 (St. at L., vol. 39, p. 573), or who may hereafter be appointed, shall take rank and precedence with officers of the naval medical corps of the same rank according to the dates of their respective commissions or original appointments; and all such dental officers shall be eligible for advancement in grade and rank in the same manner and under the same conditions as officers of the naval medical corps with or next after whom they take precedence, and shall receive the same pay and allowances as officers of corresponding rank and length

of service in the naval medical corps up to and including the rank of commander: *Provided*, That dental surgeons shall be eligible for advancement in pay and allowances, but not in rank, to and including the pay and allowances of captain, subject to such examinations as the Secretary of the Navy may prescribe, except that the number of dental inspectors with the pay and allowances of captain shall not exceed 4½ per centum, and the number of dental inspectors with the rank, pay, and allowances of commander shall not exceed 8 per centum of the total authorized number of dental officers: *Provided further*, That dental officers shall be eligible for advancement to the pay and allowances of commander and captain when their total active service as dental officers in the navy is such that if rendered as officers of the naval medical corps it would place them in the list of medical officers with the rank, pay, and allowances of commander or captain, as the case may be: *And provided further*, That dental officers who shall have gained or lost numbers on the navy list shall be considered to have gained or lost service accordingly; and the time served by dental officers on active duty as acting assistant dental surgeons and assistant dental surgeons under provisions of law existing prior to the passage of this act shall be reckoned in computing the increased service pay and service for promotion of dental officers herein or heretofore authorized.

All appointees authorized by this act shall be citizens of the United States between twenty-one and thirty-two years of age, and shall be graduates of standard medical or dental colleges, and trained in the several branches of dentistry, and shall, before appointment, have successfully passed mental, moral, physical, and professional examinations before medical and professional examining boards appointed by the Secretary of the Navy, and have been recommended for appointment by such boards: *Provided*, That hereafter no person shall be appointed as assistant surgeon in the navy who is not a graduate of a standard medical college.

Officers of the naval dental corps shall become eligible for retirement in the same manner and under the same conditions as now prescribed by law for officers of the naval medical corps, except that section 1445 of the Revised Statutes of the United States shall not be applicable to dental officers, and they shall not be entitled to rank above commander on the retired list, or to retired pay above that of captain.

All dental officers now serving under probationary appointments shall become immediately eligible for permanent appointment under the provisions of this act, subject to the examinations prescribed by the Secretary of the Navy for original appointment as dental surgeon, and may be appointed assistant dental surgeon with the rank of lieutenant (junior grade) to rank from the date of their probationary appointments: *Provided*, That the senior dental officer now at the United States Naval Academy shall not be displaced by the provisions of this act, and he shall hereafter have the grade of dental surgeon, and the rank, pay, and allowances of lieutenant commander, and he shall not be eligible for retirement before he has reached the age of seventy years, except for physical disability incurred in the line of duty.

All acts or parts of acts inconsistent with the provisions of this act relating to the dental corps of the navy are hereby repealed: *Provided*, That nothing herein contained shall be construed to legislate out of the service any officer now in the medical department of the navy, or to reduce the rank, pay, or allowances now authorized by law for any officer of the navy.—*Army and Navy Register.*

English Army Dental Service.

Call for More Dental Surgeons.

The Committee on Army Dental Service, under the chairmanship of Mr. D. F. Pennefather, has issued a report and made certain recommendations which we think should receive the earnest attention of those responsible for organizing the medical services for the war. The committee's recommendations, briefly stated, are: (1) That a greater number of qualified dental surgeons should be employed for the treatment of the troops. (2) That a larger number of specially skilled dental surgeons should be detailed for the treatment of jaw wounds. (3) That dental surgeons should be withdrawn from combatant and other non-combatant services and detailed for dental duties. (4) That the general organization of the dental service should be under the direction of one or more experienced dental surgeons under the orders of the Director-general of the Army Medical Service. The last is by far the most important suggestion, and we are sure that if it were acted upon the inadequacy and somewhat indifferent working of the dental service would be efficiently dealt with.

We notice that Mr. Macpherson, in a reply to Mr. Pennefather, stated that men before being sent on foreign service were examined to see if dental treatment was required, and

that such treatment, when necessary, was carried out by dental officers. In theory this may be so, but experience has shown that this examination is not always properly carried out, partly owing probably to overwork of the dental officers, and partly to a lack of proper supervision of the work of those officers. For each command in this country there is a dental adviser, but it is essential, if this office is to be efficiently filled, that men of considerable experience should be appointed and men whose judgment can be trusted.—*Lancet.*

Training Discharged Service Men as Dental Mechanics.

TECHNICAL SCHOOLS IN ENGLAND.

IN the House of Commons, Mr. Pennefather asked the Pensions Minister whether he was aware that the Liverpool Dental Hospital had established a technical school for the training of disabled sailors and soldiers in dental mechanics; and, if so, would he take steps to encourage the establishment of similar technical schools for the same purpose in other towns. Mr. Hodge replied: "A scheme for the training of discharged sailors and soldiers in dental mechanics at Liverpool Technical Institute is now under consideration. Courses of instruction have been approved and are being carried on at London, Manchester, Swansea, and Newcastle-on-Tyne, and every encouragement is being given to the establishment of courses in other towns. —*Lancet.*

American Ambulance Surgeons Awarded Legion of Honor.

As further proof of appreciation on the part of the French Government for the work accomplished at the American Ambulance in Neuilly, the Cross of Chevalier of the Legion of Honor was awarded to Mr. Louis V. Twyeffort, who was one of the founders of the hospital and a member of the committee, and later vice-chairman.

The same honor was conferred upon G. B. Hayes, D.D.S., who organized the dental department, and gave it his services from the opening of the hospital, also upon W. S. Davenport, D.D.S., who was the assistant chief of the Dental Department, and upon Dr. James P. Hutchinson, who entered upon his work for the Ambulance in June 1915, as chief surgeon of the Pennsylvania University Unit.—*New York Herald*, Paris edition.

Army Dental Corps.

THERE have been no examinations for appointment to the reserve dental corps, and there will not be for some time on account of the large number of available candidates who are on the waiting list. There are now 209 officers in the regular dental corps. In addition to this there are 5291 commissioned in the reserve corps and 257 in the National Guard, of whom about 2000 are on duty.

INSTRUCTION.

There are 160 reserve officers under instruction at Fort Oglethorpe, Ga. Every two months 80 reserve dentists are sent there for a two months' course, and every month a like number of dental assistants are sent to the same place for one month's training.—*Army and Navy Register.*

Appointments in Naval Dental Corps.

As a result of the recent examinations held at the Naval Medical School, Washington, twenty-one candidates were found qualified for appointment in the Naval Dental Corps. Commissions in the regular navy will be issued to those at the top of the list, and when all vacancies in the regular corps are filled, the remaining successful candidates will be issued temporary appointments. The dentists who passed the examinations are, in the order of their standing: E. R. Tilley, Washington, D. C.; H. A. White, Jamestown, N. Y.; E. L. Walter, Washington, D. C.; F. D. Clancy, Framingham, Mass.; E. G. Hoylman, Indianola, Nebr.; H. B. Duncan, Freehold, N. J.; J. A. Flynn, Youngstown, Ohio; E. H. Brown, Trenton, N. J.; E. H. Zimmer, Seaton, Ills.; A. L. Burleigh, Plattsburg, N. Y.; P. B. Maskrey, Martins Ferry, Ohio; A. W. Bluim, Chicago; A. H. Yando, Fitchburg, Mass.; C. H. Nelson, Jamestown, N. Y.; R. E. Dickson, West Somerville, Mass.; J. A. Kelly, Boston, Mass.; C. C. Jones, Cisco, Texas; J. E. Morgan, Washington, D. C.; R. Schmucker, Philadelphia, Pa.; J. F. Quinn, New Haven, Conn., and A. Smith, New Orleans, La.—*Army and Navy Register.*

Promotions.

Dental Reserve Corps.

THE following appointments (promotions) are announced (May 18th):

To be CAPTAINS: 1st Lieuts. Fred C. Allender, Isaac H. Archer, Egbert E. Baker, Francis A. Boylan, Roscoe Bristow, Carver R. Brown, Rex P. W. Capwell, Wm. Z. Carroll, Owen L. Chesnutt, Edward E. Court-

right, George N. Frost, Robert L. Hart, Roy Hudson, Richard C. Kiebler, Paul K. McGee, Leon M. Muedeking, Edwin J. T. Simon, Wm. L. Smith, Clarence M. Van De Water, George S. F. Waldo, Clarke B. Weeks, Joseph P. Werrick, Odon J. Wilda, and Alex. J. Zimmer.

Announced May 24th:

To be First Lieutenants: Charles J. Denholm, Harry Holmes, Elmer H. Nicklies, Harold Jensen, Edward W. Blurock, Daniel S. Lockwood, Thomas W. Deyton, James B. Mann, Avery S. Hills, George M. Rabbitt, Judge W. Fowler, Francis S. Adams, Archie T. McGuinness, Carl H. West, Edwin M. Kennedy, Merle W. Catterlin, Thomas M. Page, Clarence P. Jackson, Chester B. Parkinson, Herbert E. Guthrie, and James H. Keith.

Announced May 25th:

To be Captains: 1st Lieuts. James E. Bailey, Wm. J. Barto, Howard Bock, Joseph L. Brown, Roy D. Gabbert, Joseph W. Golding, Henry L. Grant, Howard A. Hale, Jay M. Hisey, John O. Lessig, Clayton A. Patterson, Charles P. Shewey, Charles W. A. Spies, Ralph Burkhart, Samuel B. Ginsberg, Guy R. Harrison, Leonard J. Heiman, Clarence B. Laffin, Cameron E. Lane, Jay H. Lee, John S. Owens, William E. Paul, Merton M. Postle, James H. Stacey, LeRoy Tileston, George E. Walker, and Raymond LeR. White.

Announced June 1st:

To be Captains: 1st Lieuts. Thomas C. F. Shirley and Robert S. Cameron.

Announced June 8th:

To be Major: Capt. Max C. Frazier.

To be Captains: 1st Lieuts. Harry A. Tuckey, James T. Conner, Harry B. Riley, Leo B. Muzzy, and Howard R. Dingler.

Assignments.

Army Dental Corps.

Week ending May 18th.

Maj. Richard B. Clark to Louisville, Ky., Camp Zachary Taylor, for temporary duty in the base hospital.

Week ending May 25th.

The following to Fort Oglethorpe for course of instruction and return to their stations: Lieut.-cols. Harold O. Scott and Frank P. Stone.

1st Lieut. Robert L. Strickland from Fort Oglethorpe, Ga., to Garden City, N. Y., aeronautical general supply depot, for duty.

1st Lieut. Arthur T. Burchill from duty at Fort Oglethorpe to Charlotte, N. C., Camp Greene, for duty with 3d motor mechanics regiment.

1st Lieut. James B. Manning from Fort Oglethorpe to West Point, Miss., aviation camp, for duty.

1st Lieut. Campbell H. Glascock from Fort Oglethorpe to duty at signal corps aviation mechanics training school, Minneapolis, Minn.

1st Lieut. James A. Curtis, Jr., from Fort Oglethorpe to Camp Greene, N. C., for temporary duty in base hospital.

1st Lieut. Neil J. McCollum from Fort Oglethorpe to Camp Greene, N. C., for duty with 4th motor mechanics regiment.

1st Lieut. William Hoblitzell from Fort Oglethorpe to Camp Devens, Mass., for duty.

The following from duty at Fort Oglethorpe to Waco, Tex., aviation mobilization camp, for duty: 1st Lieuts. Lewis W. Maly, William F. Scheumann, and William B. Stewart.

Week ending June 1st.

Col. George L. Mason from duties at Camp Dix, N. J., and will report at that camp for duty as camp dental surgeon.

Lieut.-col. Frank L. K. Laflamme from present duties at Camp Meade, Md., and will report at that camp for duty as camp dental surgeon.

Week ending June 8th.

The following from his present duties at camps specified, and report there for duty as camp dental surgeon: Col. Alden Carpenter, Camp Travis, Tex.; Col. Frank W. Wolven, Camp Lewis, Wash.; Lieut.-col. Minot E. Scott, Camp McClellan, Ala.; Maj. John L. Shock, Camp Devens, Mass.; Lieut.-col. Wm. A. Squires, Camp Sheridan, Ala.; Maj. Benjamin C. Warfield, Camp Custer, Mich.

Dental Reserve Corps.

Week ending May 25th.

Capt. Harry M. Trafford to Montgomery, Ala., Camp Sheridan, for duty in base hospital.

Capt. Max C. Frazier to Washington, for duty in army dispensary.

Week ending June 1st.

Maj. Henry W. Rich to Camp Pike, Ark., for duty.

Maj. Oscar LeR. Whitson to base hospital, Fort Riley, for duty.

Preparedness League of American Dentists.

50 East 42d St., N. Y. City.

Statistical Report—May 1, 1918.

States.	Examined.	"Worked-for" cards.	Fillings.	Extractions.	Plates.	Crowns.	Crowns and bridges.	Bridges.	Prophylaxis.	Teeth treated.	Miscellaneous.	Total operations.
Alabama	79	68	62	101	2				39			204
Arkansas	326	248	1,078	256		7			242	9		1,592
Arizona	295	234	444	125	2	3		1	120			695
California	1,323	1,299	2,902	1,061	4	15		8	634	21	2	4,647
Colorado	55	53	156	30		1		1	33	6		227
Connecticut	1,298	1,221	3,285	1,014	8	21		11	477	9	9	4,834
Delaware	56	55	230	52		1		1	9			293
District of Columbia	97	96	212	32		2		1	45	4	2	298
Florida	30	30	62	43		1			10	1		117
Georgia	421	347	634	295		5			174	1		1,109
Idaho	5	5	20	2					4			26
Illinois	140	138	339	233	5	10	44	6	62	5		664
Indiana	2,251	1,999	4,959	1,183	4	18		2	531	18	2	6,717
Iowa	1,985	1,930	4,731	916	7	69		28	1,189	57	1	6,998
Kansas	208	194	466	128	3	10		5	109	4		725
Kentucky	328	319	705	221		8		3	133	3		1,073
Louisana	3	3	22					1	1			24
Maine	242	193	722	172	2	1		1	63	4		965
Maryland	1,868	1,239	2,913	1,134	2	40		3	273	17		4,382
Massachusetts	3,176	2,708	7,167	2,521	11	43		34	1,237	33	2	11,048
Michigan	299	289	1,028	314	5	16		5	181	12	2	1,563
Minnesota	839	804	1,779	747	2	18		13	376	17		2,952
Mississippi	26	26	33	36					14	9		92
Missouri	220	217	613	146		8		3	109	2		881
Montana	275	271	559	381	5	2		2	156	9		1,114
Nebraska	774	684	1,656	414	3	20		2	358	20		2,473
Nevada	14	14	31	22					4			57
New Hampshire	281	278	1,174	296	2	19		8	143	9		1,651
New Jersey	39	39	75	107	5	1		6	10			205
New York	10,815	10,692	20,661	14,584	62	75		94	2,500	267	27	38,270
North Carolina	147	116	472	150		3			43			668
North Dakota	1,316	1,302	3,302	833	2	18		5	547	21	9	4,737
Ohio	3,309	2,877	7,545	2,385	16	96		20	1,583	46	2	11,693
Oklahoma	834	814	1,520	392	1	25		4	536	23	3	2,504
Oregon	221	205	854	141		4		10	136	10		1,155
Pennsylvania	4,235	3,671	11,694	2,955	25	50		19	1,123	45		15 911
Rhode Island	1,108	1,017	2,587	738	3	11		11	406	6	1	3,763
South Carolina	3	3	2	2					3			7
South Dakota	42	41	111	51		2			22			186
Tennessee	808	783	1,664	588	2	4		1	526	12	1	2,798
Texas	1,143	1,091	1,801	733		9		3	720	9	2	3,277
Utah	456	321	867	176	2	16		13	159	14		1,247
Vermont	474	457	1,457	300	3	6			186	3	2	1,957
Virginia	200	150	430	155				3	64			652
Washington	8	8	26	6		2						34
West Virginia	105	103	316	91	1	2			25	9		444
Wisconsin	118	115	378	120	1	6		2	65	8		580
Wyoming	50	44	69	55		4			16	1		145
States—Total	42,045	38,841	93,813	36,437	191	672	44	330	15,396	744	67	147,654
* Dental Colleges	5,081		10,034	4,397	105	68	95	39	2,945	1,679	71	19,433
† State Directors	9,801		11,734	6,405	204	597		325	1,139	297	48,327	69,028
Grand Total	56,927	38,841	115,581	47,239	500	1,337	139	694	19,480	2,720	48,465	236,115

* Previously reported.
† Estimates previously reported.

Chas. F. Ash, *Director-general,*
New York City.

Preparedness League Notes and News.

By R. Ottolengui, *Publicity Committee.*

COMMUNICATION FROM PRESIDENT.

The third annual meeting of the League will take place in conjunction with the meeting of the National Dental Association on August 7, 1918.

We are preparing a program of unusual merit, and on account of the great work which has been done by the League during the past year, a general report will be given which will cover the several activities which we are engaged in.

Addresses will be made by prominent men on subjects appropriate to the occasion, and during the sessions of the convention, meetings of state directors and general workers for the League will be held for the purposes of instruction and stimulation of interest.

WHAT THE PUBLIC SHOULD KNOW.

Many drafted men apply to the dentist with the idea that the Government is paying for our services, and that they have a right to demand expensive bridge work and other attention without limit. This has come about because of the semi-military procedure of sending the notices on cards franked by the War department. Considerable embarrassment at times has been caused the dentist, and all local workers are justified in using legitimate means to acquaint the public of this misconception. It is also most essential that the public understand that all service given in the name of the League must be absolutely free. Accepting the smallest compensation aborts the spirit of the League, and cannot be justified.

Our members have been asked to give each drafted man one hour of free service, and whatever one chooses to give beyond that, the League is of course glad to receive. If it is deemed unwise to give additional service without fee, the patient should be discharged as having received that which is due him from the League, or advised to appeal to League headquarters for assignment for further attention.

LEAGUE BUTTONS.

We again urge all members to wear the League button as an indication that they are actively engaged in preparing our drafted men for service. Those not having the button may secure one by sending twenty-five cents to the treasurer, Dr. L. M. Waugh, 576 Fifth ave., New York, N. Y.

THE LEAGUE STUDY COURSE.

The League study course is designed for the mature practitioner to prepare him to give adequate service to our soldiers who have been injured in battle. Many thousands will return needing our best care, therefore it is our duty and privilege to give every assistance possible in this direction. The course will be practical in character, and approved by our best authorities. Information may be obtained by addressing the office of the president, 131 Allen st., Buffalo, N. Y.

LANTERN SLIDES.

The League has prepared 25 sets of slides, which have been distributed to the different state directors to be used by sectional units and dental societies in general. The public also may find much of interest in viewing these pictures. Each set is practically divided into two parts, one set arranged by Major Heckard, comprising nearly 90 slides, and traces the plans and development of the great work of caring for the drafted men. The evolution of the different form cards, together with their application, is graphically depicted, and is of especial benefit to directors and members of the League generally. Every district director should show these slides to his workers.

The second set of about 35 slides was arranged by J. W. Beach, and aside from conveying general information of the League and its work, gives special emphasis to the wonderful DENTAL MOTOR CAR of the League in a series of most interesting pictures. These are available through the state directors. There is a lecture in synopsis form accompanying each set of slides.

J. W. Beach, *President.*

FROM DIRECTOR-GENERAL TO STATE DIRECTORS.

I am inclosing herewith copy of the report prepared by Major Heckard up to May 1, 1918.* This will give each state director an opportunity to see just what has been done in his state up to May 1st.

The grand total for the United States is

---

* See Statistical Report, preceding page.

236,115 operations. This is a fine showing, but we are going to make it 1,000,000 operations.

Don't criticize the states that have a small number of operations reported. Their required quota may not have been as big as yours, and then, too, some states have only recently got started. Just watch the reports from now on and see them grow.

In a few days we will send you a report of the work done to June 1st, and thereafter each month. There's a big surprise coming in that June report.

The dental profession is going on record. Our part in winning the war is to make our boys dentally fit. Let's push that 1,000,000 operations "over the top." See if you cannot do two things: First, secure 100 per cent. of the dentists in your state as members of the League; and second, secure the co-operation of members to send in reports. Application blanks in any desired quantity will be forwarded to you upon request.

The inclosed report is nothing like as large as it would have been if a form 3-c card had been returned to our headquarters at 50 E. 42d st., New York City, for every operation. Unfortunately, many men do not see the necessity of making these reports, and I feel sure that at least 150,000 operations have been performed of which we have no record. If, therefore, you want your state to make as good a showing as possible, it is essential that you impress upon all members of the League in your state through your county directors the necessity for returning a form 3-c card to our headquarters for every operation performed.

With the German U-boats at our very doors let our profession give its answer—More sacrifice for ourselves—More help for our boys.

Major Heckard, who has been so untiring in his devotion to the work of the League, will leave our headquarters on June 11th, and proceed to Camp Greenleaf, Fort Oglethorpe, to prepare himself for special services in another field of activity in the Dental Reserve Corps. His loss to the League will be greatly felt by everyone, particularly at headquarters, and I am sure the best wishes of all our directors will follow him in his new field of action. We need your co-operation more than ever, and bespeak for his success, or when appointed the same hearty co-operation which has been accorded Major Heckard.

Yours very truly,
CHAS. F. ASH, *Director-general.*

FROM MAJOR HECKARD

I AM in receipt of your communication of June 7th congratulating me on the change I am making, and asking that I write "a short good-bye letter to the boys of the League for publication in the magazines." I will make it read "members" because there are a good many women dentists giving free dental service.

At this time I can simply state that my request to be relieved of the supervision of the Preparedness League of American Dentists and assigned to further military duty having been granted, and before I report to the officers' training camp, Camp Greenleaf, Chickamauga Park, Ga., I would like to thank the officers and members of the Preparedness League of American Dentists and all other persons who helped to make free dental service possible for the men of our new National Army.

I do not consider this work much more than started, although we have reported at this office nearly 400,000 operations to date. I feel confident that with the same co-operation and support which has been given me continued, the League will very soon be able to report 1,000,000 free dental operations.

I hope the day is not far distant when every American dentist will be a member of the Preparedness League of American Dentists.

W. M. HECKARD.

FROM CHAIRMAN OF MOTOR CAR COMMITTEE.

In order to get the dental motor car project properly before the dental profession and give them an idea of what has already been done in the way of the first models, I am asking the editors of all the magazines to publish the following statement:

It has been arranged by the chairman of the Dental Motor Car Committee to have sent to any person interested in Dental Motor Cars sets of photographs showing all details of the car direct from the photographer at the following prices:

1 set 10 plain prints	$2.00
1 set 10 linden prints	2.50
1 set 10 lantern slides	5.00

Send to the following address for these photographs: Harry C. Beitt, 12970 Emerson ave., Cleveland, Ohio, commercial photographer.

S. M. WEANER,
Chairman Motor Car Committee.

SPECIAL NOTICE.

To the Graduates of the

PENNSYLVANIA COLLEGE OF DENTAL SURGERY.

Action of the Board of Corporators.

When the Pennsylvania College of Dental Surgery closed its doors as a teaching institution there remained in the hands of the Board of Corporators a sum of money to be disposed of by the board. Several suggestions were made as to what might be the most desirable purpose for which this fund could be used. One was to establish free beds in a hospital for the benefit of dentists; this suggestion was found to be not in accordance with law. It was then suggested that the fund be given to the Research Foundation of the National Dental Association or to the Thomas W. Evans Museum and Dental Institute of the University of Pennsylvania.

The Court appointed Horace L. Henderson, Esq., of Philadelphia, a Master empowered to take testimony and make recommendations as to the final disposition of the fund.

Several hearings took place, and after listening to much testimony the Master recommended to the Court that the fund be awarded to the Trustees of the University of Pennsylvania in trust for the establishment of a research foundation to be designated by the name of The Pennsylvania College of Dental Surgery, the income thereof to be used in the School of Dentistry of the University of Pennsylvania, now affiliated with the Thomas W. Evans Museum and Dental Institute, for scientific research and investigation in dentistry, and in the purchase of books related or necessary thereto.

The foregoing recommendation was duly confirmed by decree of the Court, February 18, 1918.

The award also includes the archives of the Pennsylvania College of Dental Surgery upon its dissolution, which are turned over to the Trustees of the University of Pennsylvania for safe-keeping and any necessary beneficial use.

Robert Huey, D.D.S., *President,*
J. Howard Gaskill, D.D.S., *Sec'y,*
Committee Alumni P. C. D. S.

SOCIETY NOTES AND ANNOUNCEMENTS

NOTICES should reach the Office of the DENTAL COSMOS *not later* than the 11th or 12th of the month preceding that of publication.

Coming Dental Society Meetings.

National.

NATIONAL DENTAL ASSOCIATION. Chicago. August 5th to 9th.

NATIONAL ASSOCIATION OF DENTAL FACULTIES. Chicago. August 2d and 3d.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS. Chicago. August 5th and 6th.

AMERICAN ACADEMY OF ORAL PROPHYLAXIS AND PERIODONTOLOGY. Chicago. August 2d and 3d.

AMERICAN SOCIETY OF ORTHODONTISTS. Chicago. August 1st to 3d.

ASSOCIATION OF MILITARY DENTAL SURGEONS. Chicago.

CANADIAN DENTAL ASSOCIATION. Chicago. August 5th to 9th.

DELTA SIGMA DELTA FRATERNITY. Chicago. August 5th.

PSI OMEGA FRATERNITY—NATIONAL ALUMNI CHAPTER. Chicago. August 5th.

XI PSI PHI FRATERNITY. Chicago.

State Meetings.

JULY.

CALIFORNIA STATE DENTAL ASSOCIATION. San Francisco. July 8th to 13th.

INTERSTATE DENTAL ASSOCIATION. (Col'd.) Buckroe Beach, Va. July 10th to 12th.

MONTANA STATE DENTAL SOCIETY. Butte. July 18th to 20th.

NEW JERSEY STATE DENTAL SOCIETY. Atlantic City. July 17th to 19th.

Examiners' Meetings.

MAINE BOARD OF EXAMINERS. Augusta. July 1st.

MONTANA BOARD OF EXAMINERS. Helena. July 8th to 11th.

NORTH DAKOTA BOARD OF EXAMINERS. Fargo. July 9th.

SOUTH DAKOTA BOARD OF EXAMINERS. Sioux Falls. July 1st.

New Jersey State Dental Society.

THE forty-eighth annual convention of the New Jersey State Dental Society will be held on July 17, 18, and 19, 1918, on Young's Million Dollar Pier, Atlantic City, N. J.

The entire convention will be held on the pier. Machinery Hall will be used for the exhibits. Those who attended last year will remember the magnificent display of dental goods, and Dr. S. I. Callahan of Woodstown, N. J., chairman of the Exhibit Committee, with 25,000 square feet of space, has promised an exhibit greater than that of 1917.

The Essay Committee, under the direction of Dr. C. M. F. Egel of Westfield, will present two or three essayists of prominence—names and subjects to be announced.

Machinery Hall extension, with 10,000 square feet of space, will give ample room for clinics. Dr. Edward Stillwell of Glen Ridge, N. J., is chairman of the Clinic Committee, and has already arranged for many new and interesting clinics. This section will be of special interest.

All meetings for the presentation of papers as well as the business meetings will be held in the Greek Temple, out on the pier.

The headquarters of the society will be at the pier entrance. Mail may be directed to exhibitors, clinicians, or members in care of the Secretary New Jersey State Dental Society, Young's Million Dollar Pier.

A cordial invitation is extended to ethical practitioners.

JOHN C. FORSYTH, *Sec'y*,
430 E. State st., Trenton, N. J.

National Dental Association.

TWENTY-SECOND ANNUAL MEETING,
Chicago, August 5th to 9th.

SPECIAL ANNOUNCEMENT OF HOTELS AND GARAGES.

THE National Dental Association will hold its Twenty-second Annual Meeting in Chicago, August 5–9, 1918. The headquarters will be at the Auditorium and Congress Hotels, situated on Michigan ave., cor. Congress st. All meetings, clinics, and exhibits will be held in these two hotels, which are connected by an underground tunnel.

The important announcement at this time must be the warning: RESERVE YOUR ROOMS AT ONCE. Make reservations by mail direct to the hotel of your choice. Arrangements for parking cars should be made direct to the garage.

Hotels.

Following are the rates of the two hotels:

Auditorium Hotel (Michigan Boulevard and Congress st.): Single room without bath, $1.50 and $2.00 per day. Single room with bath, $2.50 to $4.00 per day. Double room without bath, $2.50 and $3.00 per day. Double room with bath, $4.00, $5.00, and $6.00 per day.

Congress Hotel and Annex (Michigan ave. and Congress st.): Room, detached bath (one person), $2.00, $2.50, $3.00 per day. Room, private bath (one person), $3.00, $3.50, $4.00, $5.00, $6.00 per day. Room, detached bath (two persons), $3.00, $4.00, $5.00 per day. Room, private bath (two persons), $5.00, $6.00, $7.00 per day. Suites: Two connecting rooms, private bath (two persons), $6.00 to $10.00 per day. Three or four persons, $8.00 to $14.00 per day.

Corner suites: Parlor bedroom and private bath, $10.00 to $50.00 per day.

Garages.

The following is a list of garages and rates:

CITY AUTO PARKING COMPANY.
(A. V. Jackson, Gen. Mgr.,
Michigan ave. and Lake st., Chicago, Ill.)

Our rates for storage are $1.00 for the first 24 hours, and 75 cents each additional 24 hours. At these rates cars can be taken out for driving and reparked during the same 24-hour period at same charge.

DOWN TOWN GARAGE.
(A. J. Bemmer, Mgr.,
Michigan blvd. and Eighth st.)

"We are prepared to take care of thirty or forty cars during your convention, at a special rate of 75 cents per day, providing they notify us of their identity as members of your association."

One thousand cars can be parked in Grant Park (on the Lake Front) free. The city of Chicago furnishes policemen to watch these cars.

J. P. BUCKLEY,
Chairman Publicity Committee.

GENERAL CLINIC.

Arrangements are sufficiently advanced to promise the members of the Association that the general clinic will be one of the great features of the 1918 meeting.

In conference with officers of the National Dental Association, the committee in charge of the general Clinic carefully considered the nature of the clinic to be presented this year. After trying for the past few years new features in conducting the clinic program, it is the belief that a greater number will be served and benefited by holding a General Clinic, grouped in sections: Operative, Prosthetic, Crown and Bridge Work, Orthodontia, and Prophylaxis.

To make it National in character, the presidents of the different state societies were requested each to appoint two clinicians and two associates from his state society.

Up to date, thirty-nine state societies are represented, and the remaining nine will be represented before the publishing of the official program.

Far-away Alaska is sending two, and two associates, and to make the Clinic more than National—in fact, an "Allied" affair—the Canadian Dental Association has promised ten of the best clinicians in the Dominion. In addition, there will be a few unit clinicians who will demonstrate principles that require more than two men.

It is safe to say that this Clinic will be unique in the sense that every man on the program will either be present or be represented by his associate.

DON M. GALLIE,
Chairman General Clinic.

NOTE.—*The Program of the Chicago Meeting had not come to hand at the time of closing the* DENTAL COSMOS *forms for the July issue.*—ED.

[At Chicago.]

Canadian Dental Association.

The Canadian Dental Association has accepted the very kind invitation of the National Dental Association to meet with them in Chicago, August 5 to 9, 1918.

Sydney W. Bradley, *Sec'y.*

[At Chicago.]

National Association of Dental Examiners.

The next meeting of the National Association of Dental Examiners will be held in Chicago, Ill., August 5 and 6, 1918, at the Auditorium Hotel.

For further information address

J. A. West, *Sec'y,*
417 Utica Bldg., Des Moines, Iowa.

[At Chicago.]

National Association of Dental Faculties.

The next annual meeting of the National Association of Dental Faculties will be held in the Green Room of the Congress Hotel, Chicago, Ill., August 2, 1918, at noon. The Executive Committee will meet at 10 a.m. on the 2d. The meeting will continue through August 3d.

Chas. C. Allen, *Sec'y,*
N. W. cor. 10th and Troost, Kansas City, Mo.

American Academy of Oral Prophylaxis and Periodontology.

The fifth annual meeting of the American Academy of Oral Prophylaxis and Periodontology will be held August 2 and 3, 1918, at Edgewater Beach Hotel, Chicago, Ill.

Grace Rogers Spalding, *Sec'y.*

[At Chicago.]

American Society of Orthodontists.

The eighteenth annual meeting of the American Society of Orthodontists will be held August 1, 2, and 3, 1918, at the Edgewater Beach Hotel, Chicago, Ill.

This will be an excellent meeting. It is advisable to make your reservations early.

F. M. Casto, *Sec'y,*
Rose Bldg., Cleveland, Ohio.

[At Chicago.]

Delta Sigma Delta Fraternity.

The thirty-fourth annual meeting of the Supreme Chapter of Delta Sigma Delta Fraternity will be held in the Florentine Room of the Congress Hotel, Chicago, on Monday, August 5, 1918, at 9 a.m.

Headquarters of the Fraternity will be at the same hotel, where the annual banquet will also be held in the evening, in the Gold Room. (Notify Dinner Committee *at once.*)

By order of the Supreme Chapter.

Hy. W. Morgan, *Supreme Gr. Master.*
R. Hamill D. Swing, *Supreme Scribe.*

[At Chicago.]

Psi Omega Fraternity.

The National Alumni Chapter of the Psi Omega Fraternity has established headquarters during the National Dental Association meeting at Room 230, Auditorium Hotel.

The business session of the National Alumni Chapter will be held in the New Ballroom of the Auditorium Hotel, Monday, August 5th, at 2.00 p.m.

The Psi Omega banquet will be held in the Florentine Room of the Congress Hotel at 7.00 p.m., Monday, August 5th.

Psi Omegas who expect to attend the banquet should communicate at once with Dr. M. M. Printz, 4235 Lake Park ave., Chicago.

Montana State Dental Society.

The fifteenth annual session of the Montana State Dental Society will be held at Butte, Mont., July 18, 19, and 20, 1918.

R. R. Johnson, *Sec'y,*
Great Falls, Mont.

California State Dental Association.

The California State Dental Association will hold its regular annual session for the year 1918 in San Francisco, July 8 to 13, 1918.

We will conduct our meeting this year on the Oklahoma plan, and feel that we can assure all who attend a pleasant as well as a profitable meeting. Further information may be obtained by addressing

John E. Gurley, *Sec'y,*
350 Post st., San Francisco.

Montana Board of Examiners.

THE Montana State Board of Dental Examiners will hold a session for examination July 8, 9, 10, and 11, 1918, at Helena, Mont. Applications should be in the hands of the secretary fifteen days before the meeting.

G. A. CHEVIGNY, *Sec'y*,
107 Yegen Bank Bldg., Butte, Mont.

South Dakota Board of Examiners.

THE next meeting of the South Dakota State Board of Dental Examiners will be held at Sioux Falls, S. D., beginning promptly at 9 o'clock, Monday morning, July 1, 1918.

All applications must be in the hands of the secretary by June 24th. Fee for examination $25. No reciprocity or interchange. Full information and application blanks may be received by addressing

L. S. SPENCER, *Sec'y*,
Watertown, S. D.

North Dakota Board of Examiners.

THE next meeting of the North Dakota State Board of Dental Examiners will be held at Fargo, July 9, 1918. All applications and credentials must be in the hands of the secretary July 1st. For application blanks or further information address

W. E. HOCKING, *Sec'y*,
Devils Lake, N. D.

Maine Board of Examiners.

THE Maine Board of Dental Examiners will hold their regular examination, beginning July 1, 1918, at 8.30 A.M., at the State-house.

All applications and fee, $20, must be in the hands of the secretary by June 21, 1918.

The examination for DENTAL HYGIENISTS will be given at the same time; fee $10.

WILL S. PAYSON, *Sec'y*,
Castine, Maine.

National Mouth Hygiene Association.

DEPARTMENT OF EXTENSION LECTURES.

A COMPLETE lecture set, consisting of full manuscript and thirty-six specially selected and prepared lantern slides covering the subject of Mouth Hygiene, is furnished by this association to members of state dental societies and others who may be considered as qualified to present the subject on the lecture platform.

For rental and sale terms and other particulars address the undersigned.

EDWIN N. KENT,
Director of Extension Lectures,
330 Dartmouth st., Boston, Mass.

Forsyth Dental Infirmary for Children.

NEW DEPARTMENT—LIBRARY AND MUSEUM.

THE trustees and director of the Forsyth Dental Infirmary for Children have authorized the creation of a new department, to be known as the "Library and Museum." They solicit from the dental profession contributions of books and dental periodicals, particularly those out of print and not readily obtainable by purchase; also specimens of dental abnormalities, cast, or specimens of unusual structures of dental interest, for all of which permanent acknowledgment will be given.

FREDERICK A. KEYES, D.M.D.,
Librarian and Curator of Museum.

DR. THOMAS C. STELLWAGEN.

THE

DENTAL COSMOS

VOL. LX. AUGUST 1918. No. 8

ORIGINAL COMMUNICATIONS

The Pathogenesis and Prophylaxis of Pyorrhea Alveolaris.

By Dr. MAURICE ROY, Paris, France,

PROFESSOR IN THE DENTAL SCHOOL OF PARIS; DENTIST TO THE HOSPITALS OF PARIS.

(Report presented to Section III. Dental Surgery and Therapeutics, of the Sixth International Dental Congress, London, 1914.)

(I.)

Introduction.

THE pathogenesis of pyorrhea alveolaris is one of the most controverted points of dental pathology, both in regard to its general conception and from the point of view of the initial lesion of the disease.

The differences existing between various authors appear to me to be attributable to two reasons:

First, because often under the name of pyorrhea alveolaris are included several different diseases, which, although they have points in common, are nevertheless clearly distinct, if attention is paid to their essential characteristics.

Second, because the majority of authors, examining the disease in its advanced stages, involuntarily confuse secondary with primary lesions, and consequently the adjuvant causes with essential causes; for at this stage these causes can no longer, except with great difficulty, be distinguished from each other.

It is of the greatest importance to determine the initial lesion of pyorrhea, because it is upon this knowledge that the character of the early treatment depends. It appears to me desirable to study this question from a standpoint which hitherto has not been sufficiently considered. For this purpose, having first definitely determined what is understood by the term pyorrhea alveolaris, I have taken successively all the lesions observed in the course of the disease and sought to establish the rôle which each of these plays in the evolution of the disease.

In order to avoid all sources of error, I have studied the disease more particularly at the period of its beginning, very much earlier than have a number of observers, and have endeavored to separate it from other affections with which it is very frequently associated in its course, and which may almost completely mask the initial lesion of the disease. I have, further, shown the logical evolution of pyorrhea and the rôle played therein by incidental causes; and finally, I have devoted the last portion of this work to the early prophylaxis of this disease, which is intimately connected with a knowledge of these first postulates. I have endeavored to discuss as impartially as possible the diverse opinions expressed upon the subject of pyorrhea, while studying especially the more recent works on this subject.

The bibliography of pyorrhea is extensive. Some idea of its extent may be gained when I say that the International Institute of Bibliography at Brussels has furnished me with more than 500 bibliographical references on this subject. The excellent study of Julien Tellier upon pyorrhea constitutes one of the best on this subject, and has been very useful to me in the preparation of this paper. I have been able to cite only a few other authors, in order not to prolong too greatly my study.

Part I.

CHAPTER I.

CHARACTERISTIC SYMPTOMS OF "PYORRHEA ALVEOLARIS."

What do we understand by the term pyorrhea alveolaris? I do not fail to realize that the term is faulty, since it relates to a symptom which may even be lacking in pyorrhea, and one which, at all events, is not characteristic of this disease; but I employ it here because of having to take into account the universality of its usage. Likewise, I shall study more particularly the most generally observed form of pyorrhea; and, in order not to be misunderstood, I shall outline the clinical picture of the disease at its mature period, so as to specify from the beginning that symptomatic complex which we have agreed to designate by the term "pyorrhea alveolaris."

At the mature period, then, pyorrhea alveolaris presents a series of clearly determined symptoms, namely:

(1) Looseness and irregularity of the teeth.

(2) Gingival inflammation over a greater or lesser area.

(3) The existence at the neck of the tooth of a more or less deep pocket along the root.

(4) Denudation of the root, which no longer has a pericemental ligament, and of all that portion covered by the pocket.

(5) The habitual presence of calculus upon the root in that portion which is deprived of pericementum.

(6) More or less abundant suppuration in the gingival pocket.

In this symptomatic ensemble, one single phenomenon stands out as clearly characteristic. This is the gingival *pocket*. This is why I think one should accept as a principle that what characterizes pyorrhea alveolaris at its mature state is the presence of a more or less deep pocket at the neck of the tooth, with corresponding denudation of the root in that portion covered by the pocket. All the other observed phenomena are in relation with this lesion, either as cause or effect. It is, then, the pathogenesis, the mode of formation, of this pocket which is likely to give us the exact pathogenesis of the disease.

CHAPTER II.

CAUSES OF LOCAL ORIGIN.

All the symptoms which accompany pyorrhea have been invoked as the cause of the affection, and consequently of the formation of the pocket. Accordingly, we must review each of these symptoms, in order to see if one of them can be considered as the initial lesion which would entail the formation of the characteristic pocket of the disease.

(1) *Gingivitis.* Chronic gingivitis can present a symptomatic ensemble

which approximates so markedly pyorrhea alveolaris in its developed condition that a number of authors, as Riggs, Miller, Landgraf, and many others, would interpret pyorrhea alveolaris as a simple chronic gingivitis.

But it would be erroneous to decide on their identity from the great points of resemblance between these two diseases; for if the number of people affected with pyorrhea alveolaris is large, that of people affected with chronic gingivitis from complete lack of any dental hygiene is still larger. It would then be necessary to explain why, with identical conditions, and often even much more unfavorable from the point of view of gingival inflammation and infection, some individuals often remain free from true pyorrhea during an indefinite period.

On the other hand, the existence of a gingival pocket with corresponding denudation of the root being the characteristic lesion of pyorrhea alveolaris, it would be necessary to explain why, among people presenting intense chronic gingivitis of a number of years' duration, one finds at the necks of the teeth only slightly modified gingival pockets, while among pyorrhetics with a very slight marginal gingivitis one observes noticeable gingival pockets, often going even to the apices of the roots.

In order to explain this difference it is necessary to have other etiological factors intervene, whose presence is indispensable in pyorrhea—which fact permits the gingivitis to be considered only as an incidental cause.

Again, if pyorrhea is frequently accompanied by gingival inflammation, yet this latter symptom may be totally absent in various phases of the disease, and may also be absent at the beginning, as I shall show. This consideration alone suffices to eliminate gingivitis as an initial lesion of pyorrhea alveolaris, which is distinguished very clearly by its development, its course, and its outcome from gingivitis, which latter comes only as a complication of pyorrhea—by a mechanism which I shall explain later.

(2) *Salivary and so-called serumal calculus.* The presence of calculous deposits upon the necks of the teeth and upon the denuded parts of the roots is a phenomenon almost constant at the mature stage of the disease. The majority of authors divide these deposits into two classes—one of a salivary, the other of a sanguineous origin, according as the deposit is located on the uncovered portion of the tooth (salivary calculus) or upon that part of the tooth covered by soft tissue (serumal calculus). This is a division which may be somewhat arbitrary, and perhaps the difference does not lie in the origin, but merely in different conditions of formation.* However that may be, these different deposits always accompanying gingivitis are considered by a number of authors as the factor which is productive of the pyorrhetic pocket. Indeed, tartar, by its successive depositions at the neck of the tooth, and the inflammation it produces in the gum, determines a progressive recession of this tissue; as the tartar is deposited at a level farther from the neck the root is progressively denuded and despoiled of its pericementum and of its alveolar walls, which are resorbed as the result of the extension of the intense gingival inflammation. The extension of these disorders may lead finally to the loss of the tooth by extension of the tartar into the apical region.

While this process is noticeably similar to that met with in pyorrhea, it differs, nevertheless, from this latter disease in essential points. The pocket formed solely by tartar deposits is always proportional to their abundance; they almost completely fill the pocket, the gum being resorbed *pari passu* with the deposition of the tartar. In pyorrhea, on the contrary, even in the absence of any apparent deposit of tartar, with the gum still appearing to embrace the neck of the tooth, a very deep pocket may be observed, extending even to the apex, and completely independent of the abun-

* We shall speak later of the so-called uratic deposits.

dance of calcarious deposits. The so-called serumal calculi always occupy but a very small portion of the pocket.

H. Burchard,* finally, has shown that—

> If the tooth be extracted at a comparatively early date, a dark, scaly calculus is seen to occupy the cervical portion of the root; beyond this is an area of tooth denudation, in which no deposits are found, and, toward the apex, the shreds of the thickened pericementum. There is always a space between the pericementum and calculus, showing that detachment or loss of the pericementum is in advance of the calculus.

Again, in pyorrhea the suppuration which exudes from the pyorrhetic pockets is sufficiently abundant to have given its name to the disease, and is quite often the first sign which attracts the attention of patient and dentist to some teeth that are free from calcarious deposits upon their coronal portions. In the periradicular resorption produced by simple calculous deposits, on the contrary, the suppuration is relatively insignificant, even with considerable calculous deposits, because of the slight depth of the gingival pockets.

From these various considerations it is evident that neither the gingivitis, nor the salivary, nor the so-called serumal calculi can be considered as constituting the initial lesion of pyorrhea alveolaris. Without doubt, as I shall show, they play a very important rôle in the development of the disease, once this is established by the initial lesion, but nevertheless they constitute only adjuvant causes of pyorrhea.

(3) *Infection.* If the suppuration which has given its name to pyorrhea can be absent in certain cases, even at the period of maturity of the disease, and if it be totally wanting at the beginning, yet infection, which it indicates, is none the less the habitual accompaniment of pyorrhea. Certain authors, following Galippe, have attempted to incriminate this infection as the primary cause of the disease. They have even gone to the point of claiming that it is a contagious disease, passing from tooth to tooth and from individual to individual.

To admit this hypothesis, it is not sufficient to find in the gingival pockets a more or less considerable number of micro-organisms, for it is possible to find them in all parts of the most healthy mouths—for, as we know, these have an abundant microbian flora. It would be necessary, before accepting the infection theory, to establish the constant presence in pyorrhetic pockets, or in the periradicular tissues, of a specific microbe; but the researches of all observers, without exception, show that the bacteria found in pyorrhetic pus present absolutely nothing specific, and are either streptococci or staphylococci, which are met in ordinary suppurations, associated with saprophytes, ordinary inhabitants of any healthy mouth.

It is, furthermore, contrary to all observation that pyorrhea is contagious from tooth to tooth, for this affection begins most often in isolated teeth, frequently avoiding adjacent teeth—that is to say, those which are exposed to the most direct conditions of contagion. It would be still more puerile to discuss contagion from individual to individual, for in so widespread a disease such an assumption rests upon no foundation.

Finally, if the theory of a previous infectious cause were accepted, it would still be necessary, as far as gingivitis is concerned, to explain why many individuals with badly infected mouths do not have pyorrhea, while this disease is met with in mouths which have always been well cared for. To explain this contradiction, the partizans of the infection theory have been obliged to admit that it is an infection developing only among those having an individual predisposition.* In these conditions, the infection is only a secondary element of the disease, coming into play only when it is already established. This could not be

* H. Burchard: "Varieties of Dental Calculi," DENTAL COSMOS, 1898, p. 1.

* Galippe, in a communication to the International Medical Congress, Berlin, 1890; H. Ferré, "De certaines Infections secondaires d'origine buccale," Thèse de Paris, 1906.

the initial lesion of pyorrhea, nor the primary cause of the formation of the gingival pockets characteristic of the affection.

(4) *Traumatic causes.* In the opinion of a number of authors, the primary lesions in pyorrhea would be troubles of traumatic origin, due either to malocclusion (Karolyi, Vienna) or to malpositions—in a word, to what Godon has called "ruptures of the equilibrium of the dental system," or, finally, to local irritations, as those resulting from fillings defective at the cervical margin, the absence of the point of contact between the teeth, and the piling up of food between teeth so placed, etc.

All these causes incontestably intervene in the evolution of pyorrhea, where they play the rôle of predisposing causes. But to be really the primary cause of this affection they would have to be encountered in all cases of pyorrhea without exception, and would have to precede the evolution of the disease; for a single case of pyorrhea without a similar preexisting cause suffices to destroy the whole theory. But it is incontestable that pyorrhea is seen to develop in persons free from any malocclusion, or malposition, or traumatic irritation. On the other hand, a number of individuals present malocclusion associated with malpositions and buccal infection from the lack of hygiene, who remain unattacked by pyorrhea, although there are present in their mouths many conditions considered capable of provoking this affection. It is therefore necessary, for this disease to occur, that another factor intervene, which factor alone can be considered as the initial lesion.

The irritations caused by defective fillings or poorly fitted bands or crowns can no longer be discussed, because, unfortunately, the number of defective fillings is considerable, and there are throughout the world thousands of individuals carrying similar fillings and crowns without as a consequence having pyorrhea. In addition to this, the opinion is unanimous that dental caries is rare among those affected with pyorrhea, and consequently few fillings, as a rule, are met with in their mouths. It may even frequently happen, as I have had occasion to observe, that teeth having defective fillings are the last affected among pyorrhetics.

The absence of point of contact is open to the same criticisms as dental malocclusion and malpositions; and as to the piling up of food in abnormal interdental spaces, we shall see that this phenomenon is not primary, but, on the contrary, is quite often secondary to the initial lesion of pyorrhea.

To summarize: All the traumatic causes may be present without pyorrhea; on the other hand, pyorrhea may develop without these traumatisms. Consequently the injuries inflicted upon the teeth by these several factors cannot be considered as primary features of the disease.

CHAPTER III.

CAUSES OF GENERAL SYSTEMIC ORIGIN.

Having thus eliminated successively, as the initial lesion of the disease, gingivitis, salivary and serumal calculi, infection, and traumatic injuries (that is, the ensemble of causes which would tend to make of pyorrhea a purely local disease), we now arrive at a different order of causes, which present this feature in particular: That whatever be the tissue wherein the primary lesion of the disease occurs, general systemic causes must intervene in its development—that is, the development of the disease is related to a particular weakness in the constitution of the individual.

I do not hesitate a moment to affirm that, in spite of the important rôle played in its development by local causes, pyorrhea alveolaris is a disease having origin in general causes, and that without this conception it is impossible to explain the development of this disease, which does not attack certain individuals in whom all the local causes are present, while, on the other hand, it attacks certain other individuals in whom these causes are totally lacking.

Following the very judicial expression of Julien Tellier, it is impossible to admit a centripetal progression of pyorrhea

alveolaris, as is insisted upon by the partizans of the external causes which have just been enumerated. This affection progresses centrifugally, and it is a general cause which determines the production of the initial lesion which will permit of the later development of the disease.

These general causes are probably numerous, and I do not propose to enumerate them here in detail, referring for that to the excellent study by Julien Tellier. Suffice it is to say that, with almost unanimous accord, the several authors have confirmed the views first expressed by Magitot, namely, that it is arthritism and its associated affections which are the diseases most often incriminated as giving origin to pyorrhea.

But whatever be these general causes, they are the ones which, exercising their action upon dental or alveolar tissues, determine there the initial lesion which will give birth to the symptomatic complex which it has been agreed to designate by the term pyorrhea alveolaris.

What is the tissue primarily modified by this particular general condition? That is what we are now about to try to establish by studying the different lesions observed and the theories expressed by different authors.

(1) *The tooth pulp.* The teeth attacked by pyorrhea undoubtedly present a particular structure which exhibits a remarkable immunity to dental caries. All observers are practically in accord upon the point that dental caries is, if not exceptional, at all events, quite rare, among pyorrhetic patients. This circumstance even constitutes for them a constant source of astonishment, when they observe the loss of teeth which seem to them affected by no apparent alteration. It is, indeed, remarkable that in a pyorrhetic patient who may have carious teeth, these are often the very teeth which are last attacked by the disease. This fact impelled Paul Dubois to enunciate the principle that "Expulsive periodontitis is in inverse ratio to caries." With this fact as his foundation this author has established a theory of pyorrhea which refers it to an early senility of the tooth resulting from its excessive calcification.* This alteration of the tooth would be an early over-calcification analogous to that which physiologically occurs among the aged.

This excessive mineralization of the tooth is in relation with pulpal over-activity; and indeed, dentinal calculi are frequently found in teeth affected by pyorrhea. This theory also has some phases in common with that which would place the primary lesion in the pulp. Josipowici would lead us to believe that all teeth affected with pyorrhea present pulpitis with inflammatory reaction in the periodontal ligament.

These theories find support in a fact of current observation that teeth with devitalized pulps are less frequently attacked by pyorrhea than others. On this observation is based the treatment which consists in devitalizing pyorrhetic teeth.†

Just here we wish to express an opinion which, we believe, has not yet been expressed in this connection, viz, that this observation applies especially to those teeth whose pulps were dead *before the invasion of pyorrhea.* Those teeth whose pulps had been destroyed at a relatively early age enjoy a consider-

---

* The vitality of the alveolo-dental ligament is dependent upon the more or less compact texture of the tooth, upon the diameter of the dentinal fibrillæ, and upon the proportion of organic matter which the tooth contains. Teeth rich in organic matter and poor in mineral salts are the teeth which are very susceptible to caries, *i.e.* young teeth. Teeth rich in mineral content and poor in organic matter are slightly susceptible to caries. Their attachments are not strong; their loosening and early loss result from this over-mineralization; the pulp dies of calcification, which takes place at its periphery, and the alveolo-dental ligament undergoes the same retrogressive evolution. (Paul Dubois, "Périodontite expulsive, ou Ostéo-périostite alvéolo-dentaire," *l'Odontologie,* 1892, p. 7.)

† Because of the anastomosing relations which exist between the pulpal circulation and the alveolar and pericemental circulation, the destruction of the pulp brings about, perhaps, circulatory over-activity in the periradicular tissues, which would prevent the development of pyorrhea.

able degree of immunity toward pyorrhea, while this immunity is much less obvious in those teeth devitalized after the arrival of the disease.

But one all-important fact will not permit the acceptance of the theory of Paul Dubois or that of Josipowici, viz, the fact that pyorrhea begins at the neck of the tooth, and not at its apex.

But if the primary lesion of the disease were to be localized in the tooth or in the pulp, then the most advanced lesions of pyorrhea—or, at least, their maximal appearance—should be found at the apex, which, as we know, is contrary to all clinical observations and to the data furnished by pathological anatomy. Later we shall dwell more at length upon this particular point.

Consequently, if these pulpal and dentinal modifications are very real, and are due, perhaps, to the same general causes as pyorrhea, they are without influence upon the development of the disease, and are simply synchronous with, but independent of, pyorrhea.

(2) *The cementum.* Likewise we shall discard the theory which would place the primary lesion in the cementum (Howard Stewart). Indeed, if some cemental lesions accompany the evolution of pyorrhea, these are always infinitely less marked than those of the pericementum and of the osseous tissues.

Again, as can be seen from the sections of Hopewell-Smith, cemental lesions, which constitute a hyperplasia of that tissue, are especially marked at the apex; and we shall make, in regard to this, the same observation that we have just made apropos of the pulp, *i.e.* that pyorrhea begins at the neck of the tooth, and apical cemental lesions are incapable of explaining the development of pyorrhetic lesions. It is all the more necessary to see in this cemental hypertrophy either a modification analogous to that of the dentin, of which we have just spoken, or an echo of the inflammation of the periodontal ligament which accompanies the development of pyorrhea.

(3) *The alveolo-dental ligament.* The lesions of the alveolo-dental ligament, or pericementum, are constant in the mature stage of the disease, and in the opinion of a number of authors who adopt the viewpoint of Magitot, pyorrhea alveolaris is an inflammation of the alveolo-dental ligament occurring in certain individuals predisposed by an arthritic diathesis. Thus Peirce, Kirk, Endelman, and several others make of pyorrhea a gouty localization in the pericementum, analogous to other articular localizations of gout, by deposits of uric acid or its salts in this ligament.

Before discussing the nature of the pericemental lesions, we must say a few words upon the most recently expressed theories regarding their production. Endelman* has published a very interesting paper upon this subject in which he gives the following explanations of urate deposition:

> Urates are soluble in alkaline and precipitated in acid solutions. The salts of uric acid resulting from faulty metabolism, *i.e.* incomplete oxidation of nitrogenous foods, are in solution in the blood by virtue of the alkalinity of this fluid.
>
> Now, in a state of rest, or of slight activity, the articulations, ligaments, synovial sacs, cartilages, and articular liquids have an alkaline reaction, but in the state of activity this reaction is changed into one of lowered alkalinity (relative alkalinity) or, very rarely, into a distinctly acid reaction.
>
> The deposits of uric acid salts in the ligament would, then, be due to an abnormal activity of the alveolo-dental articulations.
>
> These salts would thus be deposited in the articulations, where they would crystallize, and where, according to C. N. Peirce,† they "would act as specific irritants and engender the well-known phenomena of pain, congestion, tumefaction, exudation, faulty nutrition, disorganization of the tissues, formation of pus, osteomyelitis resulting from resorption of the alveolar process, and finally loss of the

---

* J. Endelman, "Le Problème de l'Acide urique dans ses Rapports avec les Inflammations péricémentaires," *l'Odontologie,* 1908, vol. xl, p. 289; and see also Endelman, DENTAL COSMOS, 1908, vol. l, p. 1076.

† C. N. Peirce, "Pyorrhée alvéolaire: Un Manuel de Dentisterie Opératoire de E. C. Kirk," adaptation française par R. Lemière, p. 489.

teeth—phenomena characteristic of pyorrhea. The most usual seat of deposition of these salts is at the apex of the root, where the structure of the alveolo-cemental membrane is least dense, least resistant, and most voluminous.

G. V. Black* localizes the seat of pyorrhea in the glands which he has described in the pericementum; but these, it appears, are nothing else than the peridental epithelial débris described by Malassez (1885). In a solitary case observed by him he believes himself to have found these pseudo-glands gorged with micro-organisms. Kirk† adopts the ideas of G. V. Black, and thinks that by virtue of their embryonic character, these pseudo-glands have a lowered vitality and lessened resistance to infection. They would, thus, constitute the *locus minoris resistentiæ* of the peri-radicular membrane.

According as the infection of these were superficial or deep, there would be either a purulent discharge between the cementum and its covering membrane, with formation of a purulent pocket, or a suppuration through the tissues terminating in the formation of a gingival fistula at some distance from the free border of the gum, and thus determining what is designated by the term pericemental abscess upon a vital tooth.

The theories which have just been given in *résumé* are evidently most seductive, but in this subject we cannot be content with simple imaginings or more or less ingenious deductions. These theories must be in accord with observed clinical facts, upheld by pathological anatomy.

The theories just reviewed, however, do not appear to conform to these conditions; it is easy, indeed, to raise objections to these theories which I consider unanswerable.

Thus, the theory of the deposition of salts of uric acid (Endelman) rests entirely upon the articular hyper-activity of the teeth, but if we examine these facts from the general point of view we shall at once see that they are contrary to the data furnished by clinical experience, which show that gout develops only among those individuals whose physical activity is lowered. Doubtless, it might be argued that in pyorrhea it is only a question of the articular hyper-activity of the teeth, a hyper-activity which cannot have any effect upon the general nutrition. But outside of this particular point, the theory of Endelman cannot be in accord with clinical facts, for pyorrhea is seen to develop not in teeth which are most exercised, which would be in conformity with this theory, since their articular tissues are less alkaline, but, on the contrary, pyorrhea affects more particularly the teeth least exercised. It develops with remarkable frequency in teeth completely deprived of antagonists, which, being continually in a state of rest, would have their articular surfaces always in an alkaline medium.

If teeth affected with pyorrhea are improved, and are even cured, when they are immobilized, this is not because they are no longer exercised, but exactly to the contrary, because they are more exercised. Indeed, a tooth affected with pyorrhea, if it is loose, serves either not at all or only very slightly for mastication, by virtue of its mobility and its accompanying sensitivity; while, on the contrary, when it is immobilized by a ligature or splint, it becomes firm and can be used for mastication.

A tooth deprived of its antagonist, if it is firmly connected with other teeth by a bridge, is thus forced to be of use indirectly in mastication, and the pyorrhea is ameliorated. These are the facts, in absolute contradiction to the very attractive theory of Endelman.

Not only is this theory not justified by observed facts, but even strong doubt must be cast upon the existence of uratic deposits, which appear to be rather a simple imaginary concept than a tangible reality. All authors who have desired to

---

* G. V. Black, (1) "A Study of the Histological Character of the Periosteum and Peridental Membrane," 1887; (2) "The Fibers and Glands of the Peridental Membrane, Dental Cosmos, 1899, p. 101.

† E. C. Kirk, "The *Locus Minoris Resistentiæ* in Pyorrhea Alveolaris," Dental Cosmos, 1913, p. 577.

investigate these calculi, not by the aid of theoretic deductions, but with microscopes and chemical reagents, have been led to conclude either that they are nonexistent,* or, in least unfavorable cases, that their rarity is equivalent to a negation in the presence of a disease so widespread as pyorrhea alveolaris.

In the interesting discussion which followed Endelman's communication to the Odontological Society of New York,† W. B. Dunning said: "The important question is to know if the concretions found upon the apical portion of the roots are in reality salts of uric acid." Dr. Endelman, citing the researches of Kirk and others, considered that as admitted; while the observations of Talbot, made upon a great number of cases, seem to permit a doubt in this respect. In his chapter upon uric acid as an etiological factor he concludes as follows: "Out of 950 cases examined by different chemists at different times, 5–6 per cent. gave positive results in regard to uric acid, on chemical and microscopical examination. These results demonstrate positively that interstitial gingivitis is not due solely to uric acid; this substance is only an expression of the uric acid diathesis, and a coincidence; for it is not always present in the gums and tartar of patients attacked by gout or those with the uric acid diathesis.

If, then, the presence of the gouty diathesis at the origin of pyorrhea is incontestable in the large number of cases, yet it does not follow that uric acid must play a direct and simple rôle in the development of the disease.

If uric acid plays a rôle in the production of pyorrhea, it is more reasonable, as E. S. Talbot thinks, to consider it, not as a mechanical irritant, in the form of salivary calculi, but rather, through the medium of the circulation, as a toxic chemical irritant to the cellular protoplasm, and as thus injuring the vitality of the cells of the alveolo-dental tissues.

Regarding the theory expressed by G. V. Black and by Kirk, which localizes the initial lesion of pyorrhea in the pseudo-glands—which are, as we have said, the periodontal epithelial débris of Malassez—this theory does not conform to the data furnished by pathological anatomy, if we consider articles presented by Hopewell-Smith and by Mendel Joseph. If these epithelial masses play a rôle in the development of lesions of the radicular ligament, it is only at an advanced period, when, according to the description given by Roemer, "the periodontal ligament, infiltrated by small round cells, is transformed into a granular tissue (granulomatous), analogous, it seems, to fleshy buds,"* and it is at this period that the periodontal ligament is invaded by epithelial masses in the form of a wedge or cone.

This description of the lesion of the alveolar ligament at an advanced period of the disease confirms the excellent description given by Malassez in 1885.† But except G. V. Black, who has only one case to support his theory, no other investigator has been able to confirm the considerable rôle which this author assigns to this epithelial débris.

Mendel Joseph, whose anatomical-pathological works upon pyorrhea are very noteworthy, has sought, in a recent study, to verify Black's ideas, to which Kirk has brought the support of his theoretical deductions. Joseph‡ has arrived at conclusions diametrically op-

* M. Galippe, with the aid of two chemists, MM. Brun and Goullard, has in vain sought for the presence of uric acid in the saliva and in fresh tartar upon the teeth of pyorrhetics. Nash says that the occurrence of a true tophus upon the roots of teeth is an absolute impossibility; the differences between the tophi and radicular deposits are so essential that it is inconceivable that they ever could have been confused. (Julien Tellier, *loc. cit.*, p. 55.)

† Dental Cosmos, 1908. *l'Odontologie*, 1908, vol. xl, p. 357.

* Julien Tellier, "La Pyorrhée alvéolaire," p. 21; O. Roemer, "Periodontitis und Periostitis alveolaris," *Handb. d. Zahnheilk.*, 2d ed., vol. ii.

† Malassez, "Débris épithéliaux paradentaires," *Archives de Physiologie*, 1885.

‡ Mendel Joseph, "Le *locus minoris resistentiæ* de la Pyorrhée alvéolaire, selon Black et Kirk: Recherches histo-bactériologiques," *l'Odontologie*, 1914, vol. i, p. 241.

posed to those of these two authors, which I could not do better than to quote:

Starting with the idea of justifying the hypothesis of our eminent American *confrères*, I arrived at the point of having to express a completely different opinion. Not one of my preparations, and many of them were clear demonstrations, permitted me to recognize in the glandular body of Black a tendency, or peculiar predisposition, to fix the infectious agent in the course of the pyorrhetic process. My observations have led me to conclude that the epithelial débris of the peridental membrane (I do not here refer to the epithelial débris scattered through the gingival tissue) is stifled and destroyed by the formidable influx of leucocytic infiltration, even before micro-organisms can reach it.

Thus the theory of deposits of uric acid salts in the pericementum, and the theory of epithelial rests, that of Black, cannot be accepted, if we may depend upon clinical observation, chemical researches, or microscopic examination.

(4) *Pericemental abscesses upon vital teeth; their nature.* To justify the analogy of pyorrhea alveolaris with the development of gout, the most frequently invoked fact is one observed in a rare form of the disease, characterized by the formation of alveolar abscesses upon vital teeth, which evolve in part as abscesses due to pulp death. The pulps of these teeth are vital, the gum appears to be intact at the necks, and these abscesses appear to form on the middle of the roots, without other apparent communication with the outside than a fistulous opening at the surface of the gum.*

Kirk* describes the observed symptoms thus:

The clinical phenomena attending the evolution of this condition are in general those of other inflammations of the pericemental membrane, but modified somewhat as to their violence. A slight uneasiness about the root of the affected tooth is first felt, followed by increasing tenderness to percussion, slight extrusion of the tooth from its alveolus, increasing pain of a dull, throbbing character, localized swelling which does not become diffused over a large area, no tendency to the infiltration of surrounding tissues, no burrowing of pus into adjacent territory; and finally, localization and pointing of the abscess and evacuation of the inflammatory products upon the gum surface at a point close to the inflammatory focus.

To explain the formation of these abscesses, whose nature has hitherto appeared very difficult to determine, a number of authors affirm that it is a question of gouty tophi of calcium urate, which was deposited upon the root by the medium of the circulation, and which determined an abscess by infection through the blood stream. It was seen above that in Kirk's opinion these abscesses are the result of the invasion of Black's pseudo-glands through the blood stream.†

Having had occasion to observe some of these cases, whose pathogenesis is so obscure, and having been able to establish absolutely its real etiology, it seems to me to be worth while to insist partic-

* A tooth exhibits the symptoms of acute apical pericementitis; a bistoury passed into the apex of the swelling over the root may give vent to a glairy, mucus-like discharge, or, in some cases, pus flows. A further examination may reveal the loss of underlying alveolar wall; on exposing the root, which is partially denuded of pericementum in this area of denudation, the presence of a calculus is detected. The pulp responds to tests for its vitality, and the gum margin and marginal pericemental attachment appear to be intact." (Henry Burchard, "Varieties of Dental Calculi," DENTAL COSMOS, 1898, vol. l, p. 8.)

* E. C. Kirk, "Abscesses upon Teeth with Living Pulps," DENTAL COSMOS, 1898, vol. l, p. 621.

† [In the paper quoted by Dr. Roy I merely suggested as a possibility that pericemental abscesses might result from hematogenous infection. In a later paper[1] I called attention to Black's observation of the direct infection of the epithelial rests of the peridental membrane through the gingival tissues, an observation which clearly determines the modus of infection in pericemental abscess as well as in pyorrhea alveolaris, which, though differing in clinical expressions, are pathologically identical.—EDWARD C. KIRK.]

[1] E. C. Kirk, "The *Locus Minoris Resistentiæ* in Pyorrhea Alveolaris," DENTAL COSMOS, vol. lv, 1913, p. 577.

ularly upon a point which has not yet, to my knowledge, been brought out, and which reduces to *nil,* in the cases observed by me, the deductions in favor of the gouty tophi. Cases of this sort are very rare; a number of experienced practitioners have never encountered one. The first case which I had occasion to observe upon a maxillary first incisor, fifteen years ago, made a vivid impression upon my memory. Having been unable to find any other plausible explanation, I was not far from giving credence to the theory of the formation of the gouty tophus in the pericementum, without communication of the alveolodental articulation with the exterior. Nevertheless my mind was unsatisfied, and some years later, having had occasion to see a similar case, I examined and explored the tooth in question with the greatest care, and was rejoiced to find the explanation of the fact which had so greatly troubled me.

The patient was a woman of sixty years, an arthritic whom I had been attending for some time. She still retained all her anterior teeth, as well as her premolars. Her teeth were firm, in spite of the few light attacks of pyorrhea in the region of two premolars. One day this patient came to see me, with a vestibular abscess half a centimeter above the margin of the gum of an upper lateral incisor, an abscess absolutely analogous to those currently observed in the course of complications resulting from pulpal death and putrefaction. Yet the tooth incontestably had a living pulp, as its sensitiveness was very clearly shown in response to cold and heat. No apparent communication existed between the abscess and the gum margin. The tooth was not loose. The obvious conclusion seemed to be that it was a pericemental abscess of gouty origin, without previous communication of the alveolar articulation with the exterior. In default of a better explanation I was about to accept this conclusion, when, with a fine probe, while carefully exploring the abscess through the small gingival fistula to gain some idea of its form, I perceived that this vestibular abscess arched down over the proximal surface of the tooth and appeared to be directed backward in the direction of the palate. I then examined this region with greater attention. On this side it did not appear to have any apparent lesion. Around the tooth the gum appeared healthy. There was no recession, there was no suppuration; but what was my surprise, in passing my probe to the palatine part of the neck of the tooth in the region diametrically opposite the seat of the abscess, to see that my instrument sunk into a narrow but deep pocket extending toward the threshold of the vestibular abscess along the proximal surface of the root at about its middle third, a communication which I easily established with a fine probe.

It was, then, a question, contrary to all first appearances, of a pyorrhetic abscess, analogous to those which we commonly have occasion to observe, having its origin in a pocket open to the exterior but opening at a point apart from the opening of the pyorrhetic pocket.

It remained to establish the reasons of this peculiar evolution of the abscess. These reasons I found in the interlocking of the teeth of my patient. She had, indeed, an overbite; that is to say, in a state of occlusion her maxillary incisors completely covered those of the mandible, which impinged upon the palatine mucosa exactly at the neck of the second incisor, at the point where the pyorrhetic pocket opened, closing the mucosa over the orifice of the pocket. As a result of this, the products of infection and decomposition not being easily able to make exit through the natural orifice —the movements of mastication forcing them, on the contrary, deeper—had sought an exit at a distant point of lessened resistance—that is, toward the vestibular region.

The establishment of this fact was, for me, a ray of light as to the nature of the trouble in the first patient whom I had observed, and in whose case I had not been able to establish the true origin of the abscess; for I remembered very clearly that that patient also presented a marked overbite, and that the same

pathogenic conditions might have been present in the production of the phenomena whose true origin I had mistaken.

I have since had occasion to observe two other similar cases, one with my *confrère,* V. E. Miégeville, of Paris; and in all the cases of pericemental abscesses upon vital teeth that I have observed, the patient had an extensive overbite.

Naturally, I cannot maintain that all similar cases mentioned in the literature had an origin analogous to that of the cases that have come under my own observation; but the facts which I have adduced upon this subject show that it is necessary to be very careful in expressing a definite statement as to the nature of observed phenomena.

I am convinced that if anyone desires to undertake a detailed investigation of so-called pericemental tophic abscesses upon living teeth, he will find an analogous as well as completely natural explanation of their production; and he can determine in principle that pericemental abscesses upon vital teeth are pyorrhetic abscesses formed in a serpiginous pocket, whose opening at the neck of the tooth is obscured by reason of the location of another opening at a distant point on the gum.

(5) *Interstitial gingivitis.* According to Talbot, the initial lesion is present, not in the alveolar ligament, but in the interstitial connective tissue of the gums, whence the name, interstitial gingivitis, which he gives to the disease. From the interstitial tissue the inflammation is said to extend to the alveolar ligament and to the alveolus. These different tissues would be, according to him, adventitious and transitory organs, undergoing modifications determined by a precocious senility of the dental organs.

The lesions described by Talbot do not appear to me conformable to those described by the most recent works on morbid anatomy, all of which fail to recognize any particular lesion of the interstitial connective tissue, which, according to this author, is the seat of the initial lesion of the pyorrhea. Furthermore, I no more believe that this hypothesis is completely in accord with clinical observation and the logical evolution which it appears to me ought to be assigned to this disease.

On the contrary, I am completely in harmony with the idea of a precocious senility as the cause of the disease, as claimed by Talbot, and later I shall return to this particular point.

(To be continued.)

The Principles Governing the Construction of Permanent Fixatures in the Treatment of Pyorrhea Alveolaris: With a New Method of Construction.

By Dr. KARL ELANDER, Göteborg, Sweden.

IN the title of this article there appears a term which, as far as I know, has not previously been used in dental literature, viz, the word FIXATURE.

By this term I wish to indicate *such apparatus or appliances as are used for the fixing, stabilizing, and immobilizing of teeth which, through pyorrhea alveolaris, have lost their normal stability and firmness in the alveolar process.*

Presumably on account of the fact that this therapeutic method, especially in its more general application, is of relatively recent date, one has hitherto had to be content with more inconvenient and complex terms, such as fixation apparatus, pyorrhea retainer, pyorrhea retention, and similar unwieldy terms. In America the term "splint" is also used to designate such apparatus. The specific signification, however, of this latter term, meaning an expedient in cases of broken bones, makes the use of the term for dental cases unsuitable. I have therefore thought it more appropriate to use the term "fixature," of Latin origin, as being more in analogy with the word "ligature," which is already used in orthodontia.

Although we hope that in the near future pyorrhea patients will, as a rule, come to us for treatment during the early stages of the disease, it must be acknowledged that at the present time we are far from this goal.

In the majority of cases the patients are totally unaware of having been attacked by the disease, and become cognizant thereof only when it has reached such an advanced stage that one or more teeth have become seriously loose. This symptom is but too often just the one which at last attracts their attention, and compels them to apply to the dentist for help.

In other cases the patients really have noticed alarming symptoms for years, but on consulting the dentist have received the not very cheering answer that there is nothing to be done in the matter. That the general dentist in the past has usually taken this position toward pyorrhea may be pardonable, in a way. Now, however, when we have specialists who are capable of bringing about a healthy condition—and this the more surely the earlier the case comes under treatment—it seems to me that every general dentist who will not himself undertake the treatment of pyorrhea alveolaris should feel it his imperative duty to send the patient to a specialist, as he does in the cases of malocclusion and oral surgical operations.

But even if such a custom should promptly come to be adopted, we could nevertheless not hope to reach in a reasonably near future the state where advanced cases of pyorrhea would not very often be met with, and we must therefore not cease to make the therapeutics of the advanced stages a subject of special study.

The authors on the subject are unanimous as to the usefulness of the fixature in the treatment of loose pyorrhea teeth. Some authors go so far as to not only consider the fixature to be of secondary significance, but even to declare that it possesses a direct healing effect.

In accordance with this belief we find as recently as 1909 in the DENTAL COSMOS a long, enthusiastic article by Houston([20]), entitled "Immobilizing as a Cure for Pyorrhea Alveolaris."

Undoubtedly there is ground for the belief that, if not an entire cure, at least a powerful help to that end may be achieved by the fixation of the teeth. We all know that rest, partial or total, is a most valuable expedient in therapeutics. Nevertheless, I must add that the fixature should not be relied upon in the treatment of pyorrhea alveolaris as the sole means of bringing about a cure.

Fig. 1 illustrates a case where the disease was cured without applying a fixature. The radiograph shows that the

FIG. 1.

disease was very far advanced when I began the treatment. The right central incisor was denuded up to the apical region, and the right lateral and the left central had lost their alveolar support up to the middle of the root. At the time of photographing the teeth were so loose that the patient could not brush them, and had to be content to cleanse them with pieces of cotton. The gums were swollen and bled easily, and there was present a never-ceasing flow of pus. The patient was unable to bear the expense of a permanent fixature, and for some time, therefore, the teeth were fixed with silk ligatures. These, however, showed a tendency to force the teeth from their normal positions, and had to be given up. By degrees we finally succeeded in getting the better of the disease, and the patient has managed without silk ligatures or any other kind of fixation for two years. Although the teeth are still very loose, they are fit for service and are otherwise sound.

For all that, it is my opinion that a permanent fixature would be very useful to the patient at this time. A permanent fixature produces an exceedingly comfortable sensation of security and rest in the mouth; the patient need no longer be cautious in the movements of the tongue and lips, but is now able to move them freely.

At the first sitting I apply a temporary fixature, which does service until the suppuration has ceased, and the gum has become fairly normal; then I apply the permanent fixature.

THE THREE ESSENTIAL REQUIREMENTS OF A PERMANENT FIXATURE.

I wish to lay down the following three principal requirements of a rationally constructed permanent fixature:

(1) It must be of such construction that devitalization of the pulp is unnecessary.

(2) It must effect a permanent stability of the teeth.

(3) It must satisfy the demands of mouth hygiene.

A secondary, though not unimportant requirement is that the demands of esthetics should be considered, in so far as is compatible with the fulfilling of the three principal requirements.

(1) AVOIDING DEVITALIZATION OF THE PULP.

Concerning the first principal requirement, viz, avoiding devitalization of the pulp, opinions, as expressed in literature, have differed in a most radical manner, and at present there is little doubt that the adherents of the kinds of fixatures which require devitalization of the teeth are in a decided majority. It is not so many years ago that a large group of ardent adherents maintained the dogma that the devitalization *eo ipso* was a particularly advantageous therapeutic expedient in the fight against pyorrhea alveolaris, and one which, independently

of the need for fixation, should be practiced on all pyorrhetic teeth. As recently as 1912 Mamlok([14]) expressed this opinion without any reserve. The belief was that through the removal of the pulp the periodontium would be enabled to utilize the blood supply from the arteries which otherwise supplied the pulp. Though this argument to me seemed very faulty, and much the same as if a surgeon, who could not get an injured finger to heal rapidly enough, amputated a sound finger next to the injured one in the hope of thus making use of the sound finger's blood supply. Nevertheless, because of the repeated assurances as to the beneficial results obtained by this method I was tempted to try it in one case. The result was absolutely negative.

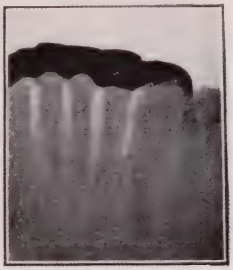
So far from the extirpation of the pulp being a benefit to the diseased periodontium, it is, on the contrary, an obvious danger even though both the tooth and its entire surroundings be perfectly healthy. Our actual knowledge of the apical conditions establishes without contradiction the fact that every tooth without a pulp is a permanent *locus minoris resistentiæ*.

In pulp extirpations and root-fillings the first requirement is that we do not ourselves cause infection, and second that we succeed in hermetically closing the apex. Should we fail as to the first requirement, then we have from the beginning created a dangerous seat of infection, whether we close the foramen or not—and who dares to say that he absolutely closes the foramen? But even if we succeed in this, the possibility is always present that the apex may become infected in a hematogenous way.

Rosenow([21]) has now shown that even rather harmless streptococci, such as streptococcus viridans, if debarred from oxygen supply, evolve into pathogenic bacteria of high virulence. Further, it has been shown that these streptococci are able to penetrate into the bloodvessels, and, preserving their virulence, may lodge in some narrow capillary in the heart, kidneys, or other organs. There they cause metastatic abscesses, which may prove fatal, and at best may cause considerable disturbance with accompanying depression and suffering.

An abscess at the apex of a tooth root means a daily depression, the importance of which is evident from the large number of authenticated cases presented where diseases in other organs, which have been suspected to be connected with an apical seat of infection, have healed quickly after the apical infection had been removed, and this although the diseases had previously defied even the most painstaking treatment. Ottesen of Christiania once showed me a patient who had been blind in one eye, and had been referred to him by an eye specialist. An apicoectomy was performed for this patient, and little by little the sight returned.

Fig. 2.



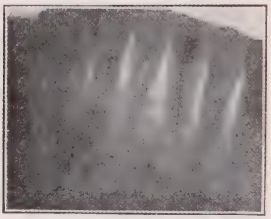
Under such circumstances I do not hesitate to contend that the devitalization of a sound pulp is a worse crime than the one of placing crowns on untreated roots. The latter case constitutes a reprehensible omission, but in the former case we directly *cause* a pathogenic condition.

Fig. 2 shows a very common and very illustrative case. The crowns are perfectly sound, the disease is not extremely far advanced, though the teeth are rather loose. Who dares to say that, with a view to stabilizing the teeth, we are justified in bringing about in this case five *loci minoris resistentiæ* in a jawbone which in the corresponding apical regions is quite sound. If some day the patient should become affected with

one or perhaps several purulent granulomas in this region, could he not with very good reason reproach us for a treatment, adverse to the teaching of science, which unnecessarily caused him this injury and its possible sequelæ in the form of heart or kidney diseases, etc.?

It is bad enough if such things happen through want of knowledge, but it is much more deplorable when dentists deliberately reckon with this risk, and attempt to justify their methods of procedure by thinking they may correct any subsequent trouble by performing an apicoectomy, not taking into account the possibility that an apicoectomy may be resorted to only *after* a kidney or some other important organ has been injured. Such reasoning seems in any case as unethical as when a physician who, in vaccinating a patient against smallpox happens to transfer syphilis to him, consoles himself with the thought that syphilis may be healed by means of salvarsan. No medical man has the right to treat a patient in such a manner that the latter thereby contracts an illness, when it is at all in the power of the physician to avoid such an occurrence.

Fig. 3.



Moreover, apicoectomy means such a great loss of root substance that it should be avoided as long as possible, even by the dentist who is shortsighted enough to limit his range of observation only to the strictly local field of pyorrhea alveolaris.

In Fig. 3 the root of the central incisor is already denuded more than half-way. The pulp was devitalized—which, by the way, caused the patient pain for several days. The extirpation was extremely laborious, and not until a labial trephining had been performed did it prove in some degree successful. But the radiograph shows that an apical pulp fragment was left, and this continued to live and to retain its sensitiveness. It was impossible to remove it, although every possible way was tried. Finally we decided to attempt to devitalize the fragment with sulfuric acid; but to no avail. In order that no one may think that I treat my patients too roughly, perhaps I should state that the patient in this case was *myself*. This case proved to be very instructive to me. Shortly afterward a granuloma developed—also seen in the illustration—which was only discovered by chance when I tried my new roentgen apparatus on the tooth. Thanks to the devitalization, I then had to submit to an apicoectomy (as patient), which proved to be a particularly valuable experience.

Fig. 4.

Fig. 5.

It is not beneficial to the tooth, however, to be deprived of nearly half of its

already insufficient root portion. (See Fig. 4.) And in spite of the fact that part of the jaw-bone beneath the apex has since formed anew, and that the tooth has been immobilized by means of a fixature, the tooth is to this very day, the fourth year after the operation, sensitive when biting, and has a diminished functional power.

Fig. 5 presents a case where an apicoectomy is out of the question. Here the sockets are atrophied entirely down to the apex, and the connection of the tooth with the jaw-bone is effected by little else than the pulp. An apicoectomy here would thus be equivalent to exodonty, and devitalization *per se* would undoubtedly mean a breaking-up of the continuity between the tooth and the periodontium.

The experienced pyorrhea practitioner knows that even in such extremely advanced cases the few remaining fibers of connective tissue perform their duty to the utmost, with an admirable faithfulness. Several years ago I managed to persuade the patient in question to allow me to apply a permanent fixature to her teeth. Before that she had managed to make out for some ten years with provisional arrangements, in spite of the fact that she is without occluding molars, and is therefore compelled to put a double burden of mastication on her incisors. The patient has an unconquerable aversion to artificial teeth. Her pyorrhea is now subsiding in a satisfactory manner, and all the pulps are thriving nicely, which is manifest by the hyperesthesia of the root surfaces.

Moreover, the preservation of the pulps secures the important advantage to the teeth of keeping them more elastic and transparent, with no risk of discoloration. There is no doubt that, on the whole, a tooth loses more or less of its power of resistance to pathogenic insults and mechanical damages after having lost the pulp. Further, it is my firm conviction that the very fact of maintainance of the pulp in a vital condition is of powerful assistance in our fight against pyorrhea alveolaris itself. The extirpation of the pulp creates at best a cicatrix at the apex; but cicatricial tissue is always of less value than normal tissue, both as regards its functional capacity and as to its faculty of nourishing itself. On the other hand, it is quite evident that the bloodvessels of the living pulp offer possibilities of compensating, to a certain degree, for any superpressure on the diseased periodontium. The apical regions are supplied by end arteries, which do not branch off in any other direction but to the pulp.

Finally, it should be remembered that the devitalization in itself is very unpleasant to the patient.

(II) PERMANENT STABILITY OF THE LOOSE TEETH.

I now come to the second principal requirement of the fixature, viz, that it must permanently stabilize the loose teeth. This requirement implies that the fixature must possess a certain rigidity, that it must not be springy, and must not yield or bend under moderate strain. Otherwise the fixature cannot stand the strain of mastication, and its connection with the teeth to be stabilized will inevitably be impaired.

The points of connection between the fixature and the teeth are already in themselves points of weakness. It is therefore very important that their number be not too small and, above all, that they be not situated all on the same level, as is the case where silk or metal thread fixatures are employed. In such a case the fixature, even though it were perfectly rigid, would not be capable of keeping the teeth immobile for any length of time. The teeth would act as regular levers, with either the apex or the point of connection as the fulcrum. We have all seen teeth which, although they have been fixed to absolute stability in a correct line by means of a silk thread have after some time become deranged.

Suppose we let three sticks, which at one end are movably fixed, represent as many teeth, we shall find that if we bind together their other ends by means of a horizontal plane, the swinging circle will

still be considerable. If we attach to the sticks another horizontal plane, the mobility will be reduced to nearly naught, *i.e.* the sticks will be immobilized. The more horizontal planes we attach, the more will the stability be increased.

This experiment shows how desirable it is to have the connection between the teeth and the fixature effected by as many horizontal planes as possible; in other words, that the areas of connection shall extend as much as possible in the direction of the longitudinal axis of the tooth.

It may be that the hope of bringing this about has led to the devitalization of the pulp with the aim of using the root-canal for anchoring the fixature; or perhaps this practice originated from the use of the pivot tooth, whence it has been transferred to the bridge, and thence to the fixature.

However, if we look into the matter a little more closely, we shall find that the anchorage in the root-canal does not necessarily provide in a satisfactory way for the need of extended areas of connection in the direction of the longitudinal axis, as these areas of connection should function in all directions of the transverse axis, in order that the aim be gained. Now, if we regard Fig. 6, reproduced from the work "Die Alveolar-Pyorrhoe und ihre Behandlung," by Neumann, we find that the distance from the occlusal limit of the fixature to its apical limit at the end of the root-pin is considerable. But we must not forget that this distance is of significance only as regards the masticatory insults to which the tooth may be exposed from the labial region. As to all insults from the approximal or lingual regions, the root-pin alone will have to bear the pressure, because, in order to use the root-canals with due observance of the necessary parallelism, the fixature must be so constructed that at the crown it rests against the lingual surfaces solely. The lower incisors, however—a group of teeth which, as we know, is most often in need of being fixed—receive the largest pressure labio-occlusally. The consequence is that it is here, first and foremost, that we should have a mechanical anchorage, and by no means, at least not *solely,* in an apical direction. The catch-phrase coined by Rhein that "The center of gravity of the fixture is to be located in the root-canal," is altogether incorrect, if "center of gravity" is to be

Fig. 6.

interpreted as meaning the point of anchorage. If the main anchorage is placed in the root-canal, then, on account of the law of levers, its extension must be made longer. We know too well that this is not always possible along the lower incisors, and from Fig. 6, which we may consider a typical case, this is evident.

A third consequence of the demand for stability is the desirability of anchoring the mobile tooth or group of teeth to two firm neighboring teeth, preferably situated at each of the two extreme points of the fixature. Even when it is a question of stabilizing only one small central incisor, this method of attachment is the most advisable. In some specific cases the supporting teeth may be chosen in the row of the supported ones, but preferably not. As, for technical reasons, it is particularly difficult to attach a fixature which comprises more than six teeth, one may in extreme cases, if all the six should be loose, be justified in omitting firm supporting teeth from the fixature. If these teeth are in a curved line, they become perfectly immobilized by the rigid fixature, in spite of their various degrees of looseness, for the reason that the teeth and the fixature form one coherent block.

The position of a body is determined, and is invariable, if it has at least three fixed points so located that the lines connecting them form a triangle. The experiment with the three sticks referred

Fig. 7.

to above illustrates this. Fig. 7 shows six extremely loose upper incisors made perfectly immobile without the assistance of firm supporting teeth.

(III) FULFILLING THE DEMANDS OF MOUTH HYGIENE.

The third requirement of the permanent fixature is that it shall be so constructed that it neither prevents nor makes particularly difficult the cleaning of the teeth. The fixature must not create extra recesses, which harbor food and collections of mucus, and which may be inaccessible not only to the brush and the toothpick, but also to the dentist; it therefore must not rest close against the gum, thus rendering impossible or unreasonably difficult access to the root surfaces in case a future scaling should be necessary. The fixature should everywhere face the mouth cavity with smooth and flat surfaces. It is unnecessary to enter upon this phase of the subject in a detailed manner.

ESTHETIC REQUIREMENTS.

Finally, the fixature, in so far as it is compatible with the previously formulated principal requirements, must also be constructed with regard to the demands of esthetics.

This demand is of more or less secondary importance, and not a general one. As to the posterior teeth, it may be totally disregarded, and as to the incisors, the demand does not always assert itself in an equal degree. Not infrequently the incisors are concealed behind thick lips and sometimes bushy mustaches, so that the incisors can scarcely be seen, particularly the lower ones. When, however, these teeth are clearly visible and particularly outstanding, esthetics must necessarily be considered. For instance, we should only in very exceptional cases be able to persuade such a patient to have the labial surfaces of the incisors covered with an all-gold fixature.

On the whole, however, I think one is justified in saying that the esthetic point of view in most cases becomes, in a way, of secondary importance, even when the teeth are fully visible. The necessity for a fixature is seldom met with before the patient is of a fairly advanced age, forty or fifty years or more, when he feels a greater interest in keeping the teeth in a good functional state than in a beautiful outer appearance. Besides, the teeth attacked by pyorrhea have already greatly detracted from the facial appearance for years, partly because the gum recedes, making the teeth appear abnormally long, and partly because the position of the teeth becomes abnormal when the ligamentum circulare is no longer there to keep them in normal position.

As Fig. 8 shows, broad and disfiguring diastemata arise, and the teeth protrude more and more. Shakespeare, the discerner of man, noticed this condition, and not knowing its cause, supposed it to be a symptom of senility. In one of his plays he says of a woman, "She is no longer young, because her upper teeth are already protruding."

In spite of such symptoms the patients have, by some sound instinct, abstained from sacrificing their diseased teeth on the altar of beauty. If there is a chance that the teeth may be re-

stored to a healthy condition and to working power, the patients in the majority of cases do not demand that the fixature be perfectly invisible, but will permit a fairly extended liberty of action.

HISTORY OF THE DEVELOPMENT OF FIXATURES FOR PYORRHETIC TEETH.

Before I venture to present my own method of solving the problem of the fixature, I think it would be well to review the literature, in order that we may form an idea of the development of the subject and its actual status. I must, however, previously remark that I have not had an opportunity to make such a review as thoroughly as I should have wished. Nevertheless I think it probable that I have succeeded in including in the review practically all the published types of construction, at least if I may judge from the mutual references of the authors.

Having laid down as the most important principle that the fixature must not require the devitalization of the pulp, I need not here refer to such constructions as do not fulfil this condition. Besides, the fixatures of this kind are the most commonly known and used, and it is therefore the more unnecessary to enter upon any description of them.

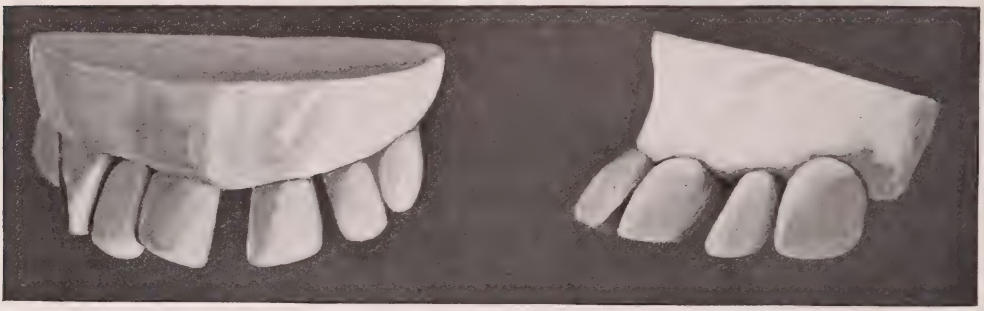
With regard to constructions which do not require devitalization of the pulp, I have found not less than twenty-one more or less alike. It has not been possible to obtain chronological data on all of them, and I therefore prefer to enumerate them in groups according to the leading principles of construction.

I shall first refer to the following constructions, each of them being an example of its group, and possessing only an historical interest:

Quedenfelt([13]) simply makes an ordinary rubber plate which clasps the lingual surfaces of the teeth, and likewise covers the occlusal surfaces.

The second is a method referred to by Warren([2]), without mentioning the originator's name. This construction consists of a gold fixature made in one piece, and secured by cement over all the loose teeth.

Fig. 8.



The following group is characterized by the fixature being mainly applied at the occlusal edges of the teeth:

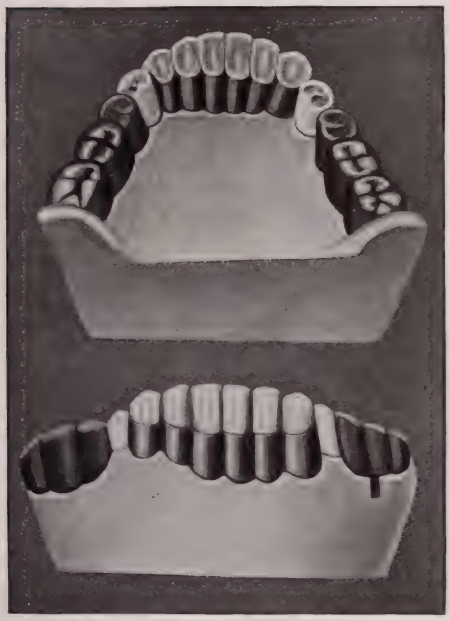
As early as 1888, Rhein—later the originator of the devitalization fixatures—stated in the Dental Cosmos that he had succeeded in immobilizing teeth by applying to the occlusal surfaces a platino-iridium wire which was fixed in position by malleted gold fillings.

The author has in one case effected a fixature by making cohesive gold fillings in the edges of the teeth. In spite of the extreme looseness of the teeth the fixature functioned for some years.

Bryan([13]) applied a gold wire to the edges of the teeth. Small pins were soldered to the wire, which fitted into a short groove, cut in the direction of the longitudinal axis of the tooth.

Cohn([8]) modified this method by sinking the gold wire down into a mesio-distally running groove, provided the edge of the tooth was broad enough; if not, he made the groove behind the edge.

Fig. 9.



Bruhn([8]) places this apparatus a bit farther in the lingual direction, so that the grooves of attachment are located behind the pulp. None of the fixatures included in this group give sufficient stability.

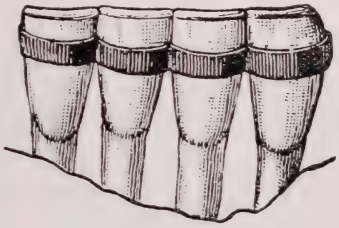
Fig. 10.

The fixatures of the next group consist of rings or bands around the teeth, soldered to each other in different ways.

Bryan([9]) (Fig. 9) applies the rings at the gum edge. For hygienic reasons this method must be rejected.

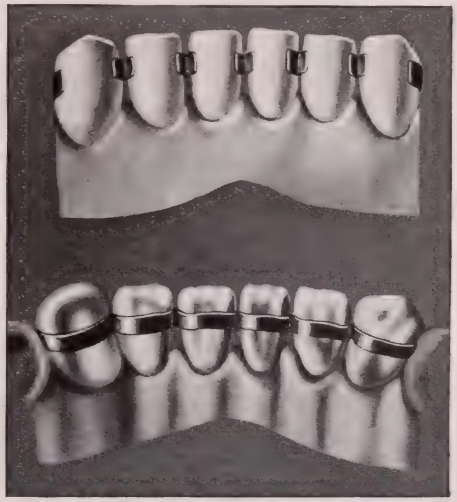
Herbst([12]) (Fig. 10) seems to have modified the method of Bryan in so far that he does not close the rings, but makes them overlap as on a key ferrule. A certain elasticity is thereby effected, which, it is true, facilitates the attaching of the rings to the teeth, but which also further impairs the hygienic conditions, and lessens the stability of the fixature.

Fig. 11.



Burchard([1]) (Fig. 11) makes the ring or band narrower, and applies it at the middle of the crown. The extension of the connecting surface in the direction of the longitudinal axis is here too small to establish the required stability.

Fig. 12.



Sachs([7 11]) (Fig. 12) removes from Burchard's rings the greater part of the

labial section, whereby the appearance but not the stability profits. He states that the originator of this appliance is Case, who many years earlier described it, but only used it as an expedient for retention after orthodontic treatment. In the pyorrhea literature this method is therefore named the Sachs-Case method.

Sachs points out that the stability may be increased, partly by allowing the cuspids to retain the ring complete, and partly by applying gold crowns on the first bicuspids. The appearance does not profit by this modification, and the improvement in the anchoring of the fixature gained from the supporting bicuspids does not eliminate the danger of the incisors gradually working loose, as their areas of connection with the

Fig. 13.

fixature are too small in the direction of the longitudinal axis of the tooth.

This objection holds also concerning the modification originated by Thiersch(9) (Fig. 13). He anchors the fixature by means of pins in the root-canals of the canines, and the method is thus appropriately to be classed among the group requiring devitalization.

Michel(11) has attempted to increase the stability of this appliance by having the interstitial parts running out in the labial direction in the form of round knobs; on to these he fastens a transverse band of celluloid.

We now come to the last group, viz, fixatures whose main part consists of a lingual plate or a lingual transverse band which is fastened to the teeth in different ways.

The most primitive of these is the method of Resch(12) (Fig. 14), which consists of a cast lingual plate and a cast labial bar, fastened to each other by means of screws passing through the interstices.

G. Marshall Smith describes in the Dental Cosmos for the year 1900 an apparatus of the same type, with a modification consisting of bars, which have been substituted for the more slender transverse bands, obtained by polishing gold foil strips against the teeth of a plaster model, and then strengthening the strips by means of solder.

Fish(3) retains in the labial transverse band only the parts facing the interstices. These parts are respectively fastened to the lingual plate by means of screws. The last three methods violate hygienic demands.

A method referred to by Warren, without mentioning the name of the originator, seems to be at least equally

Fig. 14.

advantageous from an esthetic viewpoint. The lingual plate is here furnished with holes corresponding to the interstices, and through these holes gold wires pass around the teeth.

Warren(2) (Fig. 15), in his turn, develops this idea so far as to maintain the gold wire ligatures only around the four incisors, but attaches the plate to the cuspids by means of a knob pin, which fits into a hole bored in the lingual sides of the teeth mentioned, and facing labially.

Neither of these two methods can be said to obtain sufficient stability to enable the fixature to function permanently.

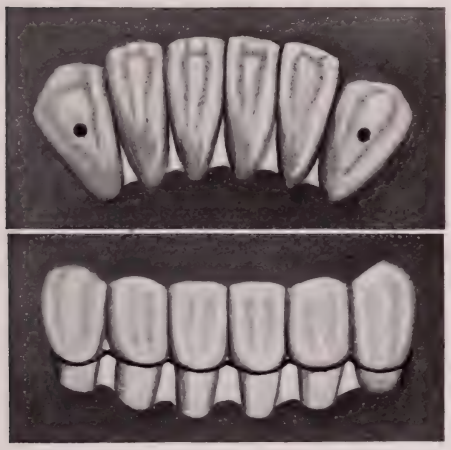
According to Warren, Trueman(2) had several years earlier recommended a lingual bar, on which were soldered a row of small pins, extending in the labial direction, and fitted into pits drilled horizontally into the center of the upper part of the crowns. Threads were cut

in the labial part of the pin, and the lingual plate was screwed to the teeth and secured by nuts.

Witkowski[10] drills pits of the same character as Trueman's, but splits the pins at their labial ends and rivets them by means of specially constructed riveting pliers, so that the split ends are turned at right angles and secured in small transverse grooves.

Mosessohn[16], who operated with Witkowski's method, found the demand for parallelism of the pits too difficult to realize, and therefore only solders two

Fig. 15.

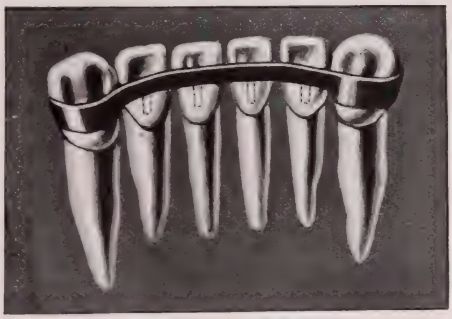


of the pins. After having attached the bar, he passes the remaining pins through both bar and grooves, and contents himself with riveting them to both the labial and lingual sides. Even if there were not occasion for well-grounded doubt as to the stability and strength of the preceding fixature, this modification certainly means a further deterioration. Witkowski's fixature is objectionable also for the reason that it creates interproximal recesses for harboring food contrary to the demands of hygiene.

Bruhn[11] (Fig. 16) secures the lingual plate by means of small pins extending in the direction of the longitudinal axis, and anchored in grooves bored behind the pulp. This I think it is possible to do only exceptionally, and at any rate the stability of the fixature will be too unreliable with so frail an anchorage.

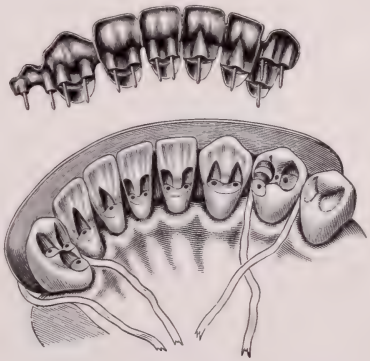
Rygge[13] sinks the lingual transverse band down into grooves cut transverely

Fig. 16.



into the lingual sides of the teeth, and to afford further anchorage, he uses small pins soldered to the band and fitting into corresponding holes. This fixature is recommended only for the upper incisors. Its small extension

Fig. 17.



longitudinally will not, I think, procure sufficient stability.

Lastly, Burgess[18] (Fig. 17), as late as December 1915, mentions in the Dental Cosmos a fixature which requires great manual skill. As the figure shows, it consists of a lingual plate, composed of cast gold inlays soldered together, one

for each of the lingual surfaces of the teeth to be stabilized. In these, steps are cut, the appearance of which the figure shows more clearly than I can describe. Two small pits are drilled longitudinally in the cervical wall of the tooth on each side of the pulp. The gold inlays are provided with corresponding pins, which thus, together with the ledge-shaped notches, form the mechanical anchorage of the fixature. Against this fixature it can be said that the surfaces of anchorage possess too small extension longitudinally. Besides, the pins must be kept too slender, and finally, the enormous difficulty of preparing from four to six notches and from eight to twelve fine pits, maintaining due parallelism, must be taken into consideration.

Some years ago I set to work at the problem of stabilizing, and not feeling satisfied with the solutions which the literature presented, I at first formulated the above-mentioned three principal requirements. Gradually I came to understand that those demands involved the following points of observation as to the details of construction:

(1) The material must possess sufficient inherent rigidity to stand the strain and wear of mastication. The consequence is, that only metals may be taken into consideration, and our experience concerning metals in the mouth limits us immediately to cast gold. Platinum and aluminum might perhaps also be considered, but the former cannot be cast, and must be used in the form of sheet metal, which is objectionable on account of its springiness; the latter metal is not sufficiently strong for the purpose.

(2) The connection between the fixature and the teeth must not be made in a direct way, for the reason that in spite of the best adaptation, nooks and corners for harboring food are created, at variance with the demands of hygiene; and also because the stability of the fixature will be of a mechanical nature only. The fixature must therefore be attached to the teeth in the same manner as gold inlays, *i.e.* by means of a thin intermediate layer of cement. There must be no deviation from the rule that the fixature *must be* of cast gold. We see daily that not even the most excellent adaptation of shell crowns can obviate caries—simply, according to my opinion, because of the springiness of plate gold, which by degrees opens a space between the gold, cement, and tooth, and allows fluids of the mouth and bacteria to enter.

(3) Simplicity is a further important desideratum. It is obvious that the greater the number of parts, loose screws, pins, metal ligatures, etc., the fixature is composed of, the less rigid it will be as a whole, the different points of connection constituting as many points of weakness. For this reason the fixature should be made in one continuous piece.

(4) Constancy in form is the next requirement of the fixature. It must not possess tiny projecting parts or edges or weak points of any kind which might yield to mechanical strain during use. Thus there should be no riveted pins or tongues bent to the tooth.

(5) Further, the fixature must be attachable as a whole in its correct site. It is sufficient if the application can be made from one side only, which also from the viewpoint of stability is the most advantageous.

(6) Connecting surfaces of the greatest possible extension, especially in the direction of the longitudinal axis, are of the utmost importance, as I have already pointed out in the beginning of my article. Devitalization being excluded, such surfaces must be chosen on the crown. Pins such as suggested by Burgess make the work more difficult to perform than is warranted by the stability effected by such means. While as a rule, as we know, it lies beyond the limits of possibility to effect an absolute immobility in relation to the jawbone—even the most powerful and sound molars show by their approximal grinding facets that there is present some movement—the strain must in the long run be too great to be met only by two short, slender pins on each side of

the pulp of a lower incisor. I do not think anyone should even consider applying a gold inlay, with an anchorage such as Burgess proposes, to a lower incisor or a canine which, for instance because of abrasion, has only the lingual half of the crown left. (Such cases are met with sometimes, as we all know.)

In consequence of this reasoning, I decided to abandon all kinds of anchorage by means of pins.

There remained then only the external surfaces of the crowns. Of these I found I could be satisfied with three, viz, the lingual and both the approximal surfaces, if only I ground the plane of the approximal ones so that they would converge mutually in a labial direction,

Fig. 18.

and form acute angles with the lingual surface. A transverse section of a tooth thus treated shows the form of a salmon's tail. (Fig. 18.) The tooth is clasped on three sides by the fixature, while the open labial side is smaller than the opposite lingual one, and therefore excludes the possibility of the tooth becoming loose from the fixature in the labial direction, provided the fixature is not springy.

A fixature of this shape can therefore only be applied to the teeth in the direction of their longitudinal axes. The fixature is kept from sliding down below its proper place by the lingual surface, which gives the tooth a greater thickness cervically than occlusally.

Considering the question from this point of view, it would seem best to grind all the approximal surfaces parallel. As this, however, with our present resources, presents too great difficulties, I grind the teeth in such a manner that the approximal surfaces of each tooth diverge toward the root. Consequently, the cervical portion of the interproximal space is made longer than its occlusal portion, but not as broad.

The strength of the attachment of the fixature to the teeth is greater and more stable in proportion as the surfaces of connection are extended in the longitudinal direction (Fig. 19). In this respect experience early taught me to be content only with the best. However, the cervical limit of the fixature toward the lingual surface should not be placed below the hindmost point of the tuberculum linguale, and on the approximal surface the limit should not extend as

Fig. 19.

far as to the enamel edge, but stop a little bit above it. In both cases access to the pyorrhea pockets would be rendered unnecessarily difficult, if a future scaling be needed. If the approximal surfaces be ground in such a way that the limits extend to or below the enamel edge, a larger labial surface would have to be sacrificed than would be compensated for by the increase in longitudinal extension.

The interstitial portions of the tooth toward the labial side are carefully shaped in such a way that they replace as perfectly as possible the approximal portions ground away. I give special attention to making narrow notches from the occlusal portion down. Thereby the impression is given that each tooth has been restored with gold fillings, and no one suspects that this visible gold is part of one continuous

piece. On the lingual surface interproximal notches are cut toward the gum, thereby facilitating cleansing.

Fig. 20.

Fig. 21.

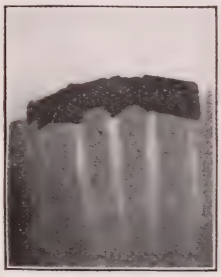


Fig. 22.

A fixature of this kind affords easy access to all the root surfaces for the removal of accretions, and allows the patient to keep his teeth clean as easily as previously, nay, in reality with even greater ease, because the stability of the fixature admits of a considerably more energetic brushing.

Fig. 23.

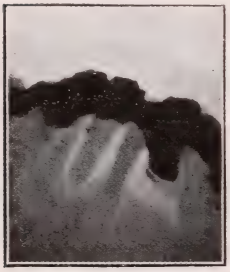


Fig. 24.

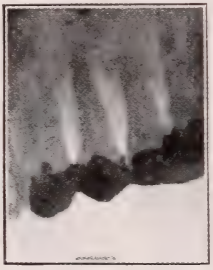


Fig. 25.

With regard to the serviceableness of this fixature in practice, I might state that to date I have applied a score or more, and all of them to the full satisfaction of my patients as well as to my own. The first one I made in January 1914. It is still, after four years, in the best condition.

A not inconsiderable advantage of this fixature over the root-canal pin fixature is the greater facility with which it may be removed should that be necessary. The dentist who has sacrificed hours of intense labor to removing fixature pins from loose pyorrhetic teeth can readily appreciate this advantage.

In an article to come I propose to describe the technique of making this fixature, and shall describe some methods which experience by degrees has shown me to be practical.

BIBLIOGRAPHY.

(1) J. S. Marshall. "Principles and Practice of Operative Dentistry." J. B. Lippincott Co., 1901.

(2) G. Warren. "Appliances for the Fixation of Pyorrheal Teeth," *Dental Brief*, 1913.

(3) W. L. Fish. "Platinum Splint for Loose Teeth," Dental Cosmos, 1900, p. 353.

(4) G. M. Smith. "Appliance for Retaining Loose Teeth," *Ibid.*, 1900, p. 383.

(5) M. L. Rhein. "Splinting Loosened Teeth in Pyorrhea Alveolaris," Dental Cosmos, 1903, p. 369.

(6) R. Weiser. "Die M. L. Rheinsche Methode der Fixation lockerer Zähne und

Modifikationen derselben," *Oest.-ung. Vierteljahrsschrift,* 1904.

(7) W. SACHS. "Die mechanische Befestigung durch Alveolarpyorrhoe stark gelockerter Zähne," *Oest.-ung. Vierteljahrsschrift,* 1906.

(8) BRUHN. "Zur Befestigung lose gewordener Schneide und Eckzähne," *Deutsche Monatsschrift f. Zahnheilk.,* 1907.

(9) W. THIERSCH. "Moderne Anforderungen an Immobilisationsapparate für Alveolar-Pyorrhoe." Verhandl. d. V. Internat. Zahnärztl. Kongresses, Berlin, 1909.

(10) WITKOWSKI. "Befestigung lockerer Zähne." Berlinische Verlagsanstalt, 1910.

(11) A. MICHEL. "Die konservierende Zahnheilkunde," *Pfaffs Handbibliothek des Zahnärztes,* Bd. 3. Dyksche Buchh., 1912.

(12) NEUSCHMIDT. "Gabel-Fixier-Apparat," *Correspondenzblatt für Zahnärzte,* 1913.

(13) G. BLESSING. "Pyorrhoe alveolaris," *Pfaffs Saml. v. Vortr.,* H. 5. Dyksche Buchh., 1911.

(14) H. J. MAMLOK. "Die Befestigungsschiene." Meusser, Berlin, 1912.

(15) R. NEUMANN. "Befestigung lockerer Zähne bei Alveolarpyorrhoe," *Deutsche Monatsschrift f. Zahnheilk.,* 1913.

(16) S. MOSESSOHN. "Eine Vereinfachung und Verbesserung der Witkowskischen Methode zur Befestigung lockerer Zähne," *Deutsche Monatsschrift f. Zahnheilk.,* 1913.

(17) R. NEUMANN. "Die Alveolar-Pyorrhoe und ihre Behandlung." Meusser, Berlin, 1915.

(18) J. K. BURGESS. "Modern Attachments for Bridge Work and Stabilizers for Loose Teeth," DENTAL COSMOS, 1915, p. 1335.

(19) G. V. BLACK. "Special Dental Pathology." C. Ash, Sons & Co., London, 1915.

(20) J. F. HOUSTON. "Immobilizing as a Cure for Pyorrhea Alveolaris," DENTAL COSMOS, 1909, p. 445.

(21) E. C. ROSENOW. "Mouth Infection as a Source of Systemic Disease," *Journ. American Medical Association,* 1914.

Non-cohesive Gold.

By L. ASHLEY FAUGHT, D.D.S., Philadelphia, Pa.

(Read before the Academy of Stomatology of Philadelphia, May 16, 1918.)

AT the May meeting of the Academy in 1913, there was read, or, more properly described, delivered with oratorical effect, one of the most remarkable papers which it has been the pleasure of this or any other society to hear. It was, as set forth in the announcement of the meeting, "A Plea for the Use of Non-cohesive Gold." (See DENTAL COSMOS, 1914, vol. lvi, p. 705.)

I had the honor to be one of those requested to open the discussion. What I then said was hardly a specific consideration of this material for filling teeth, but, as one who has been in the practice of dentistry long enough to be in personal contact in my younger days with the "fathers," who at that time were skilled in the use of this valuable material, it seems fitting to embrace this opportunity to follow up the good work of Dr. Sweeney by a further consideration of non-cohesive gold.

It is just possible that I may be the repository of some practical information, which will be presented on this occasion. It is certainly not at this date a hackneyed topic, but do not from this remark deem it not a practical subject, for non-cohesive gold has been used exclusively by most eminent practitioners, and judgment passed upon it by them as "the only material with which a permanent filling should be made."

To begin with, let us definitely understand what non-cohesive gold is. Often

we learn best what anything is by knowing what it is not.

Non-cohesive gold is not simply unannealed gold; it cannot by annealing be made cohesive. One of the inherent and peculiar characteristics of gold in a state of absolute purity is cohesion. Beyond these statements all is inferential and speculative.

In the early days of dentistry, 1835, non-cohesive gold was non-cohesive gold, and no confusion arose, as there was no other form of gold used for the purpose of filling teeth. In the decade from 1850 to 1860, the cohesive quality was recognized in the "sticky" foils, as they were termed. That which was really its first and innate quality appeared, and the question arose as to what produced the non-cohesive quality—a query, so far as the profession is concerned, that has never been fully answered. For years and years the firm of Abbey & Sons made and supplied to the profession a strictly non-cohesive gold. The making of this particular brand was the secret of that firm, and seems to have died with the death of the makers. I have used and still have in my possession some of this good old-time non-cohesive gold foil. The making, however, of a pure non-cohesive gold is not a lost art, though only a few gold foil manufacturers know how it is done, and those who know are not disposed to reveal the secret. A very good quality of non-cohesive gold foil is extant today, and while the users are few, it is still in my opinion a valuable material for saving teeth, and as such, I think should be more generally used. I hope that dentistry will not let its use become a lost art.

I may be pardoned if I assume to mention here the names of the present-day makers. The S. S. White Dental Mfg. Co. makes an excellent non-cohesive gold foil; so do Morgan & Hastings of Philadelphia, and I think, though I have not handled any of late, that the firm of Hood & Reynolds, Boston, produce it also. There is, too, on the market what is known as Swift's non-cohesive foil. This last-named product is a little thinner in the sheets than the others, and the weight used should be No. 5 or No. 6. It can be obtained from Hart & Friend of Baltimore. If pressed for an opinion as to preference I may say that the best workers with non-cohesive gold today are inclined to feel that the product of the S. S. White Co. is very close in working qualities to the old Abbey foil, which was a non-cohesive gold in fact as well as in name.

As to the manner of using non-cohesive gold. The knowledge is current that it is to be used on the wedge principle. Primarily, this means that each cavity is to be filled with cylinders or ropes of non-cohesive foil, standing on end on the bottom of the cavity, and protruding slightly above the orifice. A wedge-shaped instrument should then be forced down through the center of this mass of gold, and the gold crowded toward the lateral walls, making an opening into which other cylinders are to be placed until the cavity is again full. The process of wedging is repeated again and again until it is impossible to make further entrance and further introduction of gold. Surface condensation is then made, and the filling completed by careful burnishing.

It is evident that this lateral pressure implies the necessity for resistance. Non-cohesive gold is, therefore, to be used in all simple cavities, and in all positions in which such cavities occur. It may, however, be used either wholly or in part in nearly all compound cavities having three walls, provided two of these walls are parallel. In all cases the walls should be strong and solid, with solid edges. Sharp angles should be avoided as well as deep undercuts; retaining pits are unnecessary. It is important that the depth of the cavity should be greater than its diameter. The gold should be prepared in cylinder form for each case, remembering that the larger the pieces can be worked the better will be the result. I shall not assume to describe the method of preparing cylinders, believing that those whom I have the honor of addressing are fully competent to do this, and have,

through long usage in the handling of gold, become past-masters of this technique.

Perhaps a further word is necessary to more completely outline the application of the wedging principle in making these fillings. The wedge must be recognized as having almost unlimited lateral condensing power, and the instrument used should never be permitted to come in contact with the walls of the cavity, except at its base. Commence the insertion of the instrument into the mass of gold with a small sharp instrument, and increase the opening by using a little larger point, and so successively until lateral condensation is thoroughly accomplished, the opening made always reaching to the bottom of the cavity, for it is quite important that the cylinder now inserted to fill up this opening should, like all the other cylinders used, stand upon the base of the cavity. Condensation is made at first lightly with a coarse plugger; then firm pressure is made with a finer plugger. These pluggers should be slightly serrated. By this procedure a uniform, solid surface will be assured.

The procedure described applies to the filling of simple cavities with non-cohesive gold foil. It is assumed that compound cavities will not be attempted until the dentist has acquired considerable skill in the use of this pliable material; then his knowledge and tact will come to his aid, and make such operations easier. The principle is the same in each, but the form in which the material is used may be varied by the use of narrow mats as well as cylinders.

These cavities usually open from the crown of the tooth, and include one of the approximal surfaces. The filling is to be commenced by covering the floor of the cavity with mats or cylinders projecting into the approximal opening. Condense these thoroughly against the cervical wall. The lateral walls can then be treated in the same way, and the remainder of the cavity filled with mats a little wider than the vertical depth. In finishing, all fillings should be trimmed to the edge of the cavity, and no overlapping of gold permitted.

I claim no originality for the matter here presented to you this evening, for to me, and perhaps to some others here, it seems as "old as the hills;" but I have seized upon the opportunity to again place on record for those of the younger generation a consideration of a material which I trust may again be brought into general use.

Medical Arts Bldg.

[See also *Discussion*, as reported under "Proceedings of Societies," this issue.]

Hemorrhage and Its Treatment.

By WM. FRANCIS DREA, D.M.D., Colorado Springs, Colo.

(Read before the Colorado Springs Dental Society, Colorado Springs, Colo., March 11, 1918.)

HEMORRHAGE is a general term used to designate any escape of blood from a bloodvessel. It usually comes about as a result of injury, but certain cases may result from disease, as in scurvy or purpura.

Depending upon the vessels involved, we may classify hemorrhage as arterial, venous, and capillary; also as (1) primary, happening at the time of injury; (2) intermediate, within twenty-four hours, during the reaction period; (3) secondary, after twenty-four hours, and usually happening a week or ten days after the injury. This may be the result of sepsis, slipping of a ligature, or of failure of tissue to repair.

Hemorrhage may cease as a result of natural means. Natural cessation of bleeding results from coagulation of the blood, which increases with length of flow, from lowering of blood pressure, from weakening of heart action, as in syncope, and from retraction and contraction of the walls of the vessels, this condition being more pronounced in the arteries than in the veins.

When the bloodvessels are too large to contract spontaneously, bleeding may be controlled by pressure applied proximally to the injury when the artery is involved, and distally when the vein is concerned. Ligation of the vessel on both sides of the wound should be resorted to, and where this is impossible the main artery should be exposed and ligated at some point between the wound and the heart. Most of the smaller arteries require only seizure by the hemostatic forceps, when crushing of the intima permits of clotting. Normally, capillary bleeding may be checked by means of moderate pressure applied against sterile gauze placed over the injured area.

Bleeding from the very small vessels and capillaries may be checked by other means, such as cold; hot water at temperature between 120° and 150° F.; elevation of the part; styptics or astringents applied locally, such as tannic acid and glycerin, perchlorid of iron, adrenalin solution, and the cautery. In addition to these agents are the biochemical hemostatics introduced during the last few years, of which more details will be given later.

FACTORS CONCERNED IN COAGULATION OF BLOOD.

According to Howell, five factors are concerned in the coagulation of blood—prothrombin, antithrombin, fibrinogen, calcium salts, and thromboplastin. These are all normally in the plasma except thromboplastin, which is contained in all the tissue juices as well as in the platelets. When the blood escapes, the thromboplastin from the platelets and tissue juices neutralizes the antithrombin, thus permitting the prothrombin to become thrombin. The thrombin in the presence of calcium converts fibrinogen into fibrin. Many investigators have accepted this theory as being correct, though Morowitz has advanced one somewhat similar that is advocated by some, but into the details of which we will not here enter.

All of the factors in the coagulation of blood, or any of them, may be altered in disease, and when this occurs we get an alteration in the coagulation time.

USE OF BLOOD SERUM.

The value of blood serum as a hemostatic is unquestioned, and human, horse, and rabbit sera have been successfully used. The coagulation has been hastened by intravenous injections. Local application of fresh serum also hastens coagulation where it has been delayed. Anti-diphtheritic serum may be used until fresh serum is prepared, though it is not so effective.

There are disadvantages in the use of serum, however: Comparatively large quantities of foreign protein are injected at the same time which have nothing to do with coagulating the blood; it loses its coagulating power soon; there is danger of anaphylaxis and of other disagreeable results, and there is also delay in its proper preparation which may be harmful in emergencies.

Hess succeeded in separating the coagulative factor in serum from the noncoagulative. He found the euglobulin to be the active principle. This hemostatic contains 2 per cent. protein, and is more potent than the whole serum, containing 6 to 7 per cent. of protein.

THROMBOPLASTIC SUBSTANCES.

Hess has prepared a solution and suspension of ox-brain in physiological saline with 0.3 per cent. tricresol as a preservative. It is known as thromboplastin. He recommends it for local use in the bleeding of the newborn, nasal hemorrhage, and in the parenchymatous bleeding associated with various hemorrhages. Where local applications fail it should be injected into the site of bleeding, as in hemorrhage after tooth extraction. It can be diluted and boiled. It is innocuous by the mouth in considerable dosage, and may be of value in gastro-intestinal bleeding. Hess has also noted that it possesses healing qualities. A baby of five days had hemorrhage as the result of incision of the frenum of the tongue. Blood serum and whole blood had been injected subcutaneously, and local applications of silver nitrate and tannic acid had been made without success. Bleeding persisted for two days in spite of all efforts. Thromboplastin solution was applied locally with partial success; then a few cc. of the solution, previously boiled, were injected into the site of the hemorrhage and the bleeding stopped at once with no recurrence. Hess also regards it as almost specific in true hemophilia.

Cronin has reported on the results obtained by the department of Health in the City of New York with the use of thromboplastin solution following adenoid and tonsil operations performed by different operators. Previous to the introduction of thromboplastin solution into these clinics, injection of horse serum before operation was performed as a prophylactic measure, followed after operation by another injection of serum, if bleeding had not ceased within a reasonable time. Now thromboplastin solution is used on a mop, which is pressed on the denuded surface, and bleeding is controlled at once. It has been used in 2036 adenoid and tonsil operations, and there has not been a single case of bleeding since this has been made a routine of practice. No cases of illness or bad after-effects occurred, though the solution must have been swallowed in some cases. "Thromboplastin is safe, effective, and easily applied."

KEPHALIN.

Another biochemical hemostat has been prepared from brain tissue. It is a brain lipoid extracted by ether. Cecil followed the method advised by Howell for making kephalin from the brains of hogs. Also he used gauze impregnated with kephalin after surgical operations. This gauze was prepared by him as follows: "The kephalin is dissolved in excess of ether, about a 5 per cent. solution being made, and this concentrated kephalin solution is poured over gauze strips six feet long and six inches wide. The packs are then folded, rolled, wrapped in two muslin covers and sterilized in the steam autoclave at a temperature of 120° C. for ten minutes." This heat does not interfere with the coagulation action of the kephalin. After using this

gauze there was very little bleeding, and much less tense packing was necessary. Cecil uses it a good deal in urology; it is to be preferred to iodoform gauze. His conclusions are as follows: (1) Kephalin causes a quicker and firmer clot. (2) Not as much pressure in packing is necessary as when plain or iodoform gauze is used. (3) When packs are removed, the clot is of sufficient firmness to prevent bleeding. Hirschfelder is quoted as finding kephalin of great value in bleeding from bone, though he uses a less pure preparation of kephalin.

Other substances have been prepared, such as "coagulen ciba," an extract said to be prepared from blood platelets. The originator of this preparation is Fonio. Coagulen has been used in Germany and praised highly. Parke, Davis & Co. manufacture "coagulose," a soluble powder obtained by precipitating normal horse serum. A clot of leucocytes prepared by R. Gregoire and H. Mondon proved excellent for promoting local coagulation.

TREATMENT OF HEMORRHAGE.

Ordinarily, capillary oozing will cease of itself. But in hemophilia and the different forms of purpura the flow of blood may continue, even to a fatal result. For this reason, before operation, careful questioning as to history, individual and family, should be made. Also the coagulation time of the blood should be determined.

Hemophilia is inherited, manifesting itself in the males only, though transmitted by the female. It is not common in this country. In Switzerland and certain other parts of Europe it is found more frequently. There is little positive evidence that a lack of calcium salts exists.

In the various forms of purpura we also have prolonged bleeding. Purpura may be caused by certain drugs, circulation of bacteria or their toxins through the bloodvessels, jaundice, Bright's disease, chronic alcoholism, the so-called blood diseases (such as leukemia, anemia, scurvy) and generalized malignant diseases.

The cause of purpura simplex is not known, though it probably could be found if a bacteriological examination of the tonsils or the gums in cases of pyorrhea alveolaris accompanying it were made. The purpura hemorrhagica is especially dangerous, as profuse hemorrhage may occur from the nose, mouth, or bowel. Hess states there may be a definite hereditary purpura. There are usually purpuric skin lesions as well. There is a marked diminution of the blood platelets, prolonged bleeding-time, and a normal or slightly delayed, rarely much delayed coagulation time, also a non-retractile blood-clot that is usually soft. Purpura hemorrhagica may be an idiopathic disease or it may appear as a symptom secondary to some recognized disease, as pernicious anemia, lymphatic leukemia, diphtheria, tuberculosis, etc. Probably the fibrinogen is subnormal in amount or quality.

In hemophilia the blood platelets are normal in number; in purpura hemorrhagica they are diminished. It is known that where platelets are fewer than 60,000 per cubic millimeter the bleeding time is prolonged, and spontaneous bleeding usually occurs. When the count is below 20,000 bleeding always occurs. Constriction applied to the arm as in venesection will produce petechiæ.

Duke has pointed out the importance of a blood platelet count in studying those conditions in which an irritant like a chemical or bacterial toxin has entered the blood stream.

Weil insists that it is possible to detect non-coagulation or excessive coagulation by determining the coagulating power of the blood. He advises inquiry as to personal and family history with respect to hemophilia, thrombosis, phlebitis, etc., and tests the coagulation time of blood by distributing the blood in tubes of uniform caliber. This is sufficiently instructive for the purpose. Further information can be derived by pricking the ear with a lancet and counting the minutes before bleeding stops spontaneously. Taking up the successive drops on a blotter, hemostasis oc-

curs normally in from $2\frac{1}{2}$ to $3\frac{1}{2}$ minutes. When tests show excessive coagulation of blood there is danger of thrombosis, and ether and chloroform are to be avoided, as these injure the blood. Injections of blood serum and loss of blood may induce thrombosis in this case.

For more accurate determination of coagulation time there are the methods of Duke, Boggs, and M. Block. The advantage of determining the coagulating power of the blood lies in the fact that operation may be postponed to the time most favorable for it and proper preparation made.

After operation one of the biochemical hemostatics such as kephalin or thromboplastin solution should be used as a matter of routine. There are no advantages in using chemicals, and several disadvantages, such as destruction and sloughing of tissues, with increased risk of infection.

Swallowing of coagulating agents has no systemic influence on coagulation of blood. The agents must be locally applied or injected. There is little positive evidence that calcium is lacking in hemophilia. Weil has no confidence in calcium chlorid, whether given by the mouth or injected. In most pathological cases there has been no diminution in the calcium content of the blood. The calcium content of the serum is not increased even when large amounts of calcium salts are injected. The serum of normal individuals contains from 9 to 11 mg. of calcium per hundred cubic centimeters. Less dependence should be given to the use of calcium in prolonged bleeding, as its value is questionable. There are a few cases, though, as in hematogenous jaundice, eclampsia, pneumonia, and particularly uremia, where distinct decreases in amount of calcium are noted.

The various factors concerned in coagulation should be borne in mind, and the treatment will naturally suggest itself. There should be no stimulation until all bleeding has ceased, and then only when it is necessary. The patient should be kept warm by artificial means. After hemorrhage has ceased the patient should be treated as any other anemic individual.

CONCLUSIONS.

(1) Possibility of hemophilia or purpura should be considered, and coagulation time of blood determined.

(2) Surgical hemostasis of larger vessels should be brought about.

(3) Where local application can be made to the bleeding area one of the above-described biochemical hemostatics should be used, as after tooth extraction, oral, nose and throat operations, etc.

(4) They may be used to clear up the bleeding field during operation.

(5) The biochemical hemostatics should be injected subcutaneously previous to operation where a hemorrhagic diathesis exists, those hemostatics being chosen that can be boiled without losing their activity.

(6) Where there is danger of thrombosis or where the coagulating power of the blood is excessive the biochemical hemostatics should not be injected.

(7) Chemicals should not be used as hemostatics when the biochemical hemostatics may be secured.

(8) Less dependence should be placed on the use of calcium salts and gelatin.

BIBLIOGRAPHY.

BROPHY. "Oral Surgery."

BROWN. "Oral Diseases and Malformations."

CECIL, H. L. "The Use of Kephalin to Hasten Coagulation and Hemostasis After Surgical Operations." *Journ. Amer. Med. Association,* Feb. 24, 1917, vol. lxviii, p. 628.

CRONIN, I. I. "Thromboplastin (Tissue Extract) as a Hemostatic." *Journ. Amer. Med. Association,* Feb. 19, 1916, p. 557.

DRINKER and HURWITZ. "The Factor of Coagulation in Primary Pernicious Anemia." *Arch. Int. Med.,* May 1915, vol. xv, p. 733.

DUKE, W. W. "A Simple Instrument for Determining the Coagulation Time of the Blood." *Arch. Int. Med.,* Feb. 1912, vol. ix, p. 258.

Idem. "The Pathogenesis of Purpura Hemorrhagica, with Special Reference to the

Part Played by the Blood-platelets." *Arch. Int. Med.*, Nov. 1912, vol. x, p. 445.

Idem. "Variation in the Blood-platelet Count." *Journ. Amer. Med. Association*, Nov. 6, 1915, vol. lxv, p. 1600.

ELSMER and MEADER. *Amer. Journ. of Med. Sciences*, Feb. 1913.

GREGOIRE, R., and MONDON, H. Citation from *Journ. Amer. Med. Association*, vol. lxix, p. 1655.

HESS, H. F. "A Further Report on Thromboplastin Solution as a Hemostatic." *Journ. Amer. Med. Association*, Dec. 9, 1916, vol. lxvii, p. 1717.

Idem. "The Separation of Serum into Coagulative and Non-coagulative Fractions." *Journ. Exper. Med.*, Dec. 1916, xxiv, p. 701.

HOWELL, W. H. "The Rôle of Antithrombin and Thromboplastin (Thromboplastic Substance) in the Coagulation of Blood." *Amer. Journ. Phys.*, 1911–12, vol. xxix, p. 187.

MINOT, DENNY, and DAVIES. "Prothrombin and Antithrombin Factors in the Coagulation of Blood." *Arch. Int. Med.*, Jan. 1916, vol. xvii, p. 101.

WEIL, P. EMILE. "Le Treatment de Hemorragies par les Serums sanguins." *Presse Médicale*, 1915, vol. xxiii, p. 297.

402 BURNS BLDG.

A Comparison of Office Policies, with Special Reference to Pulp Exposure or Death.

By OTTO E. INGLIS, D.D.S., Philadelphia, Pa.

(Read before the Academy of Stomatology of Philadelphia, May 16, 1918.)

THE dental profession is now face to face with conditions that are to the mind of the writer the outcome of policies definitely pursued by dentists or by their patients with the tacit consent of the dentist. That these policies have been pursued in ignorance, on the part of both dentists and patients, as to the gravity of the outcome, in no wise lessens the difficulties to be faced.

The difficulties lie in the presence in the mouths of a vast majority of people, who have more or less regularly employed dentists—some of them very regularly according to their own accounts—of devitalized teeth numbering from one to eight or ten, with their complications of possible abscesses. Some of these teeth have been well treated mechanically, and perhaps aseptically, or more probably antiseptically, and are without abscesses or granulomas at the apices. Some have been well treated in so far as the root is well filled, or even overfilled, while radiolucent areas are to be found. A much larger number have been only partially treated, while the canals have been easily susceptible of better filling. In many of these there are no abscesses, in some there are.

It is not the writer's intention to go into the merits of root-canal work, but to endeavor to state reasons for there having been a necessity for root work at all. It is obvious that, leaving out consideration of anchorage and bridge work, fixed or removable, in which devitalization was intentional, canal work has been necessitated by pulp exposure or close approach. Why have so many cases of this sort occurred?

There are two answers: (1) The patients have waited too long before consulting the dentist, and have then usually done so because of pain. (2) The dentist has overlooked or neglected cavities existing at the time of examination, and the patient has departed in

full confidence of safety, only to suffer a surprise in an attack of pain which again takes him to the dentist.

For the first fault the remedy is education of the *clientèle* before the evil is done: such education as shall convince them that "consultation" early and often is the only method of avoiding serious cavities or pyorrhea alveolaris. The writer has talked this to his patients year in and year out, and is convinced that something more than talk at the chair is necessary to carry conviction even to those who desire to save their teeth, and believes that the time has come for a persistent campaign of education along the indicated line.

Articles should be published at frequent intervals in the daily or other publications expounding repeatedly the dangers of delay, and pamphlets dealing with various phases of dental disease and with the care of the teeth in general should be distributed to all patients, so that the knowledge shall become widespread in each community. It is by no means intended that these shall take the form of personal advertising, but be authoritative matter issued under the name of local, state, or national dental societies without even the name of the writer attached. This will involve expense for the societies in so far as the publication of the pamphlets is concerned, and the societies should be allied in this work, bearing their *pro rata* share according to membership. Outside dentists should also contribute, as it will be equally to their advantage to escape the evils of the ignorance of patients. The pamphlets in condensed form should be published by one or more societies under its or their names, and sold to individual dentists at as near cost as possible for free distribution to the *clientèle* of that dentist, and under ethical agreement. At the present time the public is getting its education largely through personal experience of individuals published in magazines.

In the second case, in which the dentist is at fault, a brief *résumé* of policies employed may be of some benefit.

There is, first, the dentist who, having complete control of his patients, orders them to return at frequent intervals, sufficiently close for at least that form of prophylaxis which keeps cavities to a minimum size, and allows no large ones to form except as an occasional and unavoidable accident. While perhaps not so impeccable as strict monthly prophylaxis, it is still a commendable policy. Whether this dentist employs the policy of strict extension for prevention in all cases of small approximal cavities is a question to be left to individual judgment. The point at issue is that no pulp exposures shall be allowed.

There is, second, the dentist who pursues the policy of filling only cavities which can be extended readily into large contours. A well-known dentist who enjoys a highly paid practice once remarked to the writer that he paid no attention to very small cavities, but saw his patients every three months, filling such cavities as in his judgment required filling. No criticism is made if he comes within the limit of safety, but the writer is convinced that such a policy will in nine cases out of ten lead to pulp exposure, and even worse, to pulp hyperemia and death under well-made fillings. Pyorrhea can of course be prevented if the dentist takes pains to observe and treat gingival irritations.

The third class of dentists pursues the policy of attending to such work as is demanded, making little effort to control regular attendance, but such work as is done is well done, and with some effort to complete the work in each mouth. Many exposures are treated, and many pulps die after effort at salvation.

A fifth class keeps the patient in continual attendance, has the office full of patients, places medicated cotton in cavities, and suggests a return next Thursday. Small and usually cash fees are exacted, though in the end the patient pays the price in money, time, and destroyed teeth. One dentist of whom the writer knows has thus earned the sobriquet of "Spit and go home," owing to his habit of spending a few minutes on

each patient and invariably making that remark. One of his patients is said to have thus spent a year and a half in having one tooth treated, though possibly some slight filling of smaller cavities was done.

The writer would finally enter a plea for frequent prophylaxis, and more especially for thorough cavity diagnosis and filling, for upon the latter much depends. It is not so easy as it seems to diagnose small approximal cavities; even the electric lamp is of no avail in many cases.

In one typical case the writer, upon complaint of the patient, separated two teeth with Perry separators, and found two approximal cavities with tiny orifices facing and closing each other; then allowed the teeth to resume their positions, and directly afterward, and with full knowledge of their presence, was unable to find them with lamp or explorer.

Even the late Dr. Miller wrote in his textbook that he had seen a number of patients, presumably of excellent dentists, who had consulted him regarding large cavities which he thought had developed during a transatlantic voyage. Without doubt they existed, but were not discovered, before the voyage was begun. Even many occlusal cavities which should be filled are neglected, and frequently the ends of fissures are not extended.

Even with the best intentions and most rigid control of patients, we may be unable to prevent an occasional exposure, but from experience the writer is convinced that such a policy is the only one that can be considered safe and sane at the present day. While it is not orthodox operative dentistry, the writer is firmly of the opinion, based upon twenty years of experience in caring for a considerable number of patients from childhood to adult life, that the strict filling of small approximal cavities as such, conjoined with other prophylactic treatment at short intervals, of say three times a year, is much superior to orthodox contour approximal work carried out because of the presence of larger cavities seen at longer intervals.

It is perfectly true that repairs are at times necessary, and even replacements required, but in the main the teeth are as well saved without pulp exposure, and are of better appearance. As before stated, however, no objection is taken to the preference for extension if, in the judgment of the particular practitioner, this be advisable.

Weightman Bldg.

[See also *Discussion*, as reported under "Proceedings of Societies," this issue.]

Interpretation of Roentgenograms.

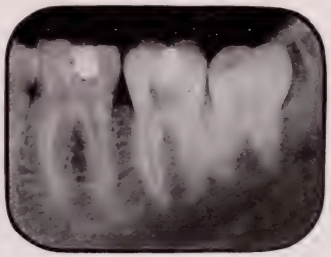
By THOMAS B. WADE, D.D.S., Philadelphia, Pa.,
INSTRUCTOR OF ROENTGENOLOGY, EVANS DENTAL INSTITUTE SCHOOL OF DENTISTRY
UNIVERSITY OF PENNSYLVANIA.

(Read before the Academy of Stomatology of Philadelphia, Pa., Thursday evening, March 21, 1918.)

I DO not know that I have anything new to offer with regard to the interpretation of roentgenograms, but before taking up that subject I want to make a few remarks on the question of which should come first, the clinical diagnosis or the X-ray diagnosis. I know that the pendulum is swinging too far toward the tendency to depend almost entirely on the roentgen diagnosis. This was illustrated to me recently when a member of the profession sent a case to me to have films made of the entire mouth. When the dentist saw the films he said, "This is not what I want; I am very much disappointed." I asked him what he had expected to see, and after some hesitation he replied that he expected to see pus showing yellow, blood-vessels red, etc., and that he had also expected to get a full diagnosis and prognosis of the case. This instance only shows how far the pendulum is swinging in the wrong direction.

One should never attempt to make an X-ray diagnosis without first knowing the full history of the case. The clinical diagnosis should always precede, and should be confirmed or rejected by the X-ray diagnosis. The roentgen ray gives us a picture in the anatomico-pathologic sense only, and was never intended to give us the true pathological findings of the case. It is only an aid in our diagnosis, and is efficient then only when it is supported by a good knowledge of anatomy, histology, and pathology, together with a full history of the case. Or in other words, "The X-ray is a part of the physical examination, not a method to supplant it; it is an extension of our faculties of sight, not a substitute for clinical diagnosis or the tactile sense; it is an analysis of different tissue densities, not a chemical reaction, and it records certain gross pathologic changes but does not seek to take the place of the microscopic slides or the culture tube." (Crane.)

Fig. 1.



The roentgen analysis is quantitative rather than qualitative, and the roentgen map is accurate for boundaries but indefinite for specific names. The X-ray diagnosis of root-canal work, fractures, and foreign bodies is final. The time may come when we may be able to learn new signs or when we can find new meanings in old signs; or we may have reached the limitation of specific signs on the plate or film. Again, the X-ray does not reveal to us whether there is pus or granulation tissue present. The accessory sinuses in normal condition are filled

with air, and anything displacing this will readily be shown by the X-ray.

Before attempting to make a diagnosis of any pathological condition we should know how the tissues appear under normal conditions. Fig. 1 is a normal case.*

The radiability of the tissue is as follows:

Radioparent..
- Skin.
- Mucous membrane.
- Pulp.
- Peridental membrane.

The shadow cast by these tissues is black, owing to the fact that they offer no resistance to the rays.

Radiolucent..
- Bone.
- Dentin.
- Lamina dura.
- Enamel and pulp stones if present.

The shadow cast by these tissues is light, from the fact that they offer slight resistance to the rays. The enamel is the most radiopaque part of the body, owing to its high percentage of calcium salts.

Radiopaque..
- Metal fillings.
- Shell crowns.
- Bridge work.
- Root-canal fillings, with the exception of plain paraffin.

The shadow cast is very light, because these materials are impervious to the rays.

The radiability of common substances is as follows:

Radioparent..
- Pure hydrogen.
- Air.
- Celluloid.
- Aluminum.
- Cardboard.
- Wood.
- Flesh.
- Rubber.

The shadow cast is black.

Radiolucent..
- Barium.
- Bismuth.
- Calcium.
- Bone.
- Teeth.

The shadow cast is light.

Radiopaque..
- Steel.
- Lead.

The shadow cast is very light.

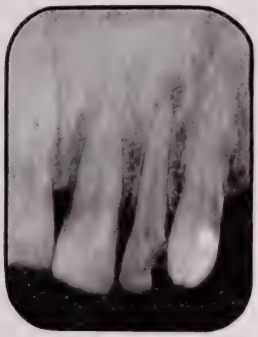
For my part of the program this evening I have chosen to show you the sequel of diseases of the dental pulp. We know that there are two varieties of pathologic changes which take place in the pulp; first, a suppurative inflammation ending in an acute alveolar abscess, and characterized by pericementitis, swelling of the soft parts, and formation of pus which burrows in the line of least resistance and collects under the periosteum or gum. One would think in a case of this kind that a great abnormality would show on the film, but such is not the case, owing to the fact that no destruction of the bone has taken place. After the pus has drained, if the lesion is not taken care of, the abscess passes into the chronic stage, and in time a dark area can be seen, as I shall show later.

Second, a proliferating pericementitis, or the granuloma, which is symptomless. This is an inflammatory growth and can usually be diagnosed by the X-ray, but in a dense mandible the area is not so well defined. The film of a granuloma shows a clearly circumscribed area or an abrupt line of demarcatien between the dark area and the surrounding tissues. (Fig. 2.) For experimental purposes the root end of the lateral (A) was amputated and the granuloma was found to be intact. The molar (B) was extracted and the granuloma was found to be intact at the root-end. According to Thoma granuloma is caused by the poisonous products of bacterial decomposition and fermentation which stimulate new protective growth in the periodontal membrane. It is made up of a fibrous capsule containing granulation tissue infiltrated by polymorphonuclear leucocytes, capillaries, small round cells,

* [The roentgenograph reproductions in this article are made in the "negative" form, thus enabling the reader to view the tissues and diseased areas as he is accustomed to see them in original film.—Ed.]

fibroblasts, endothelial and sometimes epithelial cells. Granulomas vary in size from the head of a pin to a hickory nut. There is another type of granuloma that we speak of as an epitheliated granuloma, the sequel of which is a cyst. The epithelial remnants which are normally found in the periodontal membrane have a tendency to proliferate when stimulated by chronic inflammation, and grow over the inside of the granuloma. Epithelium, being a secretory membrane, secretes a fluid, and the cyst increases in size by pressure at the expense of the bone. I do not mean to say that all granulomas go on to cystic formation; most of them do not, but in this type we have the formation of the radicular or root-end cyst.

Fig. 2.



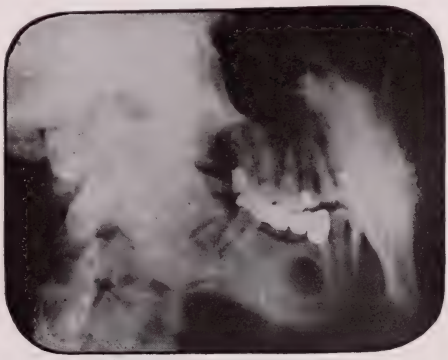
A

B

Fig. 3.

Fig. 3 is a typical radicular cyst in which the floor of the nose has been perforated. Cysts have also been known to fill the entire antrum. In this case the cyst undoubtedly originated from the right lateral incisor, which shows an incomplete root-canal filling.

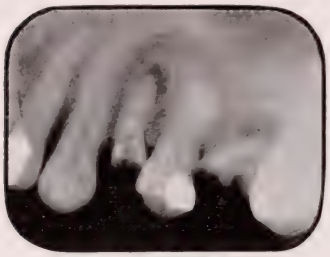
Fig. 4.



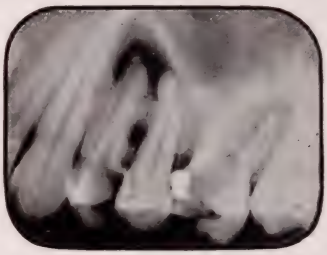
The X-ray reading of a cyst shows a large dark area with a definite border, but from a roentgenogram one cannot differentiate between a large abscess area and a cyst; one must have the clinical findings. However, the operation is the same. In a large abscess there is always more or less necrotic tissue, which must

be removed surgically. The epithelial lining of the cyst must be entirely curetted out or there will be a recurrence.

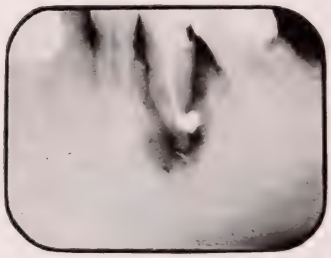
Fig. 5.



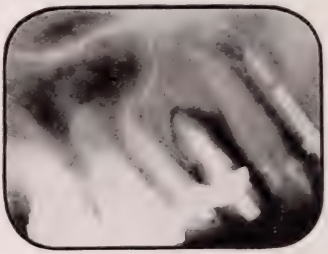
A



B



C



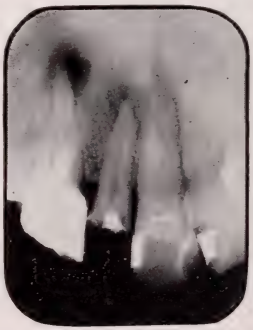
D

Fig. 4 is a cyst in the mandible, where the offending tooth has been removed. Five years ago the first molar was extracted because it was giving the patient some trouble, and a bridge was inserted. This was a severe case of neuritis of the shoulder. Three months after the cyst was curetted the patient had improved ninety per cent.

Fig. 5 is a number of roentgenograms of chronic alveolar abscesses. I mean by that, abscesses discharging pus through fistulæ: A had been discharging pus for three weeks; B had been discharging pus for one year; C had been dis-

Fig. 6.

A



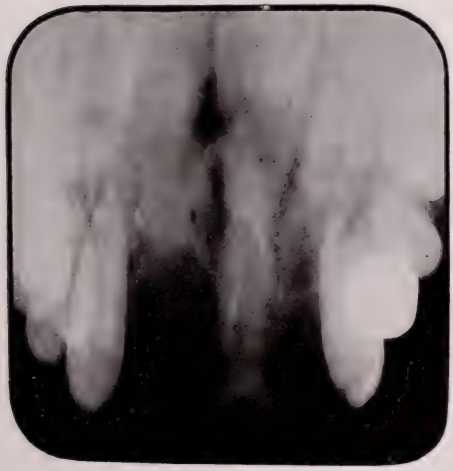
B

charging pus through the cheek for six years. Upon the extraction of this tooth two small pieces of broaches shown by the roentgenogram were found at the apical region; D is a case which had been discharging pus for ten years. From the roentgenogram one cannot tell the duration of the lesion, as all the areas appear to be about the same size. X-ray reading of a chronic alveolar abscess in most cases shows a shading off from the dark area into the light, or surrounding tissues. At the same time one will see cases of typical granuloma readings where pus is discharging. In these cases the fibrous capsule has broken down either by lowered resistance, fatty degeneration, or reinfection through the root-canal. A granuloma may be likened to a bomb with a fuse—we do not always know whether or not it is burning.

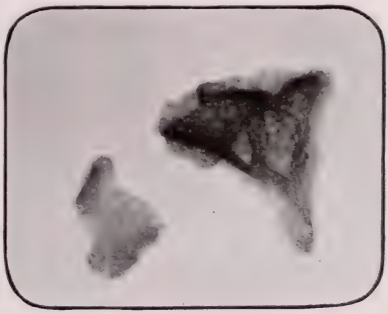
Fig. 6 (A, B) shows cases of blind abscesses. For experimental purposes these teeth were opened; pus was found in the canals. These films show about the same reading as chronic abscesses, except that there is no protecting membrane between the pus and the blood stream, and the toxins are very readily taken up. I believe I am safe in saying that 95 per cent. of the cases where post-crown teeth have been used show no attempt to fill the canal above the pin. In making a diagnosis from a roentgenogram we cannot differentiate between a blind abscess and a chronic abscess, and in some cases between a chronic abscess and a granuloma. One must depend on the clinical diagnosis, as the roentgenogram only shows us the extent of the lesion with which we have to deal.

Fig. 7.

Fig. 8.



A



B

Fig. 7 shows a necrotic area. Notice its honeycomb appearance. At the same time absorption of the root is taking place. Where you find the root-apex absorbing, all the drugs at our command will not cure the lesion; surgical means

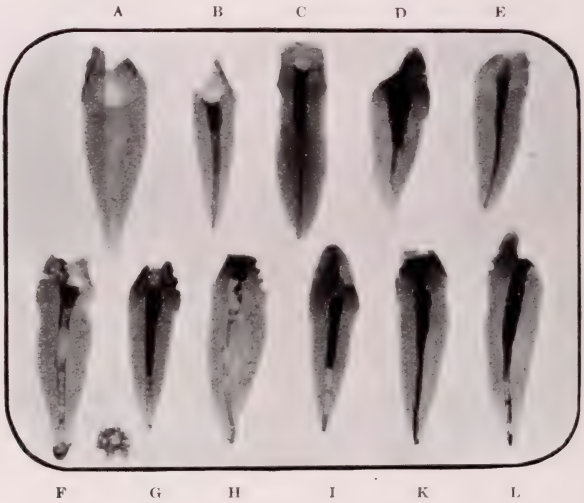
must be employed, such as root amputation or extraction.

Fig. 8 (A) is a different type of necrosis, *i.e.* syphilis. This case showed a Wassermann 4 plus. It is impossible to differentiate between syphilitic, arsenical, phosphoric, or tubercular necrosis; one must depend on the history of the case, the clinical diagnosis and the blood test. At B is shown the removed sequestrum, which involved the anterior border of the antrum and the floor of the nose on the right side.

Fig. 9 shows the radiability of the different root-canal fillings:

(A) Plain paraffin (does not show).
(B) Paraffin plus bismuth paste.
(C) Paraffin plus bismuth paste plus the gutta-percha point.
(D) Oxpara.
(E) Oxpara plus the point.

FIG. 9.



(F) Chloro-percha.
(G) Chloro-percha, plus the gutta-percha point.
(H) Euca-percha.
(I) Euca-percha plus the point.
(K) Gutta-percha point only.
(L) Oxychlorid.

They all show highly radiolucent, with the exception of plain paraffin.

40TH AND SPRUCE STS.

Minimum Requirements for Class "A" Dental Schools

ADOPTED BY

The Dental Educational Council of America

At Louisville, Kentucky, July 24, 1916, and Revised at New York City, October 22, 1917, and March 26, 1918.

By HENRY L. BANZHAF, B.S., D.D.S., Milwaukee, Wis.,
SECRETARY OF THE COUNCIL.

Albert L. Midgley, *President*, Providence, R. I.
J. V. Conzett, *Vice-president*, Dubuque, Iowa.
Henry L. Banzhaf, *Secretary-treasurer*, Milwaukee, Wis.
John H. Baldwin, Louisville, Ky.
L. L. Barber, Toledo, Ohio.
Thomas J. Barrett, Worcester, Mass.
H. E. Friesell, Pittsburgh, Pa.
S. W. Foster, Atlanta, Ga.
Louis Meisburger, Buffalo, N. Y.
A. R. Melendy, Knoxville, Tenn.
M. J. Moran, Deming, N. Mex.
A. H. Reynolds, Philadelphia, Pa.
B. Holly Smith, Baltimore, Md.
George N. West, Chicago, Ill.
Herbert L. Wheeler, New York City.

Administrative Policy.

SECTION 1. (*a*) The administrative policy of the school must be satisfactory to the Dental Educational Council of America. The dean or other executive officer must hold and have authority to carry out fair ideals of dental education.

(*b*) The value of the building and equipment (grounds excluded) must be equal to at least $300 for every student enrolled.

(*c*) The school must have facilities and equipment for at least twenty-five students in each class.

Entrance Requirements.

Sec. 2. (*a*) The requirements for entrance shall consist of graduation from an accredited high school or academy which requires for graduation not less than fifteen units of high-school work obtained in a four-year course beyond the eighth grade of the elementary school. No conditions on the foregoing entrance requirement shall be allowed.

(*b*) An accredited high school is defined as one which is accredited as a four-year high school by the United States Bureau of Education, or by a university which is a member of the Association of American Universities, or by the State University of the state in which the high school is located.

(c) In the case of an applicant who is not a graduate from a high school or academy, as defined above, the full equivalent of such education in each individual case must be established, and attested to by the highest public educational officer of the state in which is located the dental school which the applicant seeks to enter.

(*d*) The entrance credentials of each student enrolled must be kept on file, and open to general inspection, until after graduation. Not later than sixty days after the opening of school the dean shall send to the secretary of the Dental Educational Council, and to the secretary of the local State Board of Dental Examiners, a complete list of the students enrolled, together with a sworn statement

that each student is possessed of the entrance qualifications outlined above.

(*e*) Students with two full years credit from Class "A" medical schools, approved by the American Medical Association, may be admitted to the sophomore class. No other advanced credit in time may be given in any other case than as above specified. No special students shall be accepted unless they are in possession of the entrance requirements specified above.

(*f*) The foregoing regulations apply to all students, including those from foreign countries, and regardless of where the applicant expects to practice his profession.

Course of Study.

Sec. 3. (*a*) Beginning with the session of 1917–18 the course must be four years in length, each year to consist of thirty-two weeks and six days in each week. No degrees other than Doctor of Dental Surgery, Doctor of Dental Medicine, or Doctor of Dental Science may be given. Dental subjects must be taught throughout the entire four years. Schools that offer a three-year course with one year of college work as a prerequisite shall not be regarded as satisfactory.

(*b*) The school must offer a course of at least 4400 hours laboratory and didactic instruction.

(*c*) The minimum hours devoted to each branch shall be as follows:

	Hrs.
Operative and clinical dentistry	1300
Prosthetic technics	384
Crown and bridge technics	320
Operative technics	160
Oral hygiene	32
Dental anatomy	96
Orthodontia	96
Oral surgery	96
Physics, biology, or both	192
Chemistry (inorganic—organic—physiological—metallurgy)	320
Technical drawing	48
Anatomy	320
Histology	128
Pathology (general and dental)	128
Materia medica	64
Bacteriology	128
Physiology	128
Dental rhetoric	96
Physical diagnosis, anesthesia	32
Radiology	32
Jurisprudence, dental history, ethics, economics	32
Additions to above, or other subjects	268
Total	4400

Teaching Facilities.

Sec. 4. (*a*) The classes in dentistry must be taught separately from the classes in any of the other departments, if the dental school in question is part of a university.

(*b*) The patronage of the infirmary clinic must be such as to give each student at least 150 operations in fillings (gold, inlay, amalgam, cement, root-fillings, etc.), prosthetic work, and orthodontia. Treatments preparatory to the above, and cases of exodontia, must not be included in the number stated above.

(*c*) In the anatomical laboratory not more than eight students, working in pairs, may be assigned to one cadaver for a complete dissection.

(*d*) Every twenty students working in the infirmary at any given time must have the undivided services of at least one demonstrator.

(*e*) Every thirty students working in the scientific laboratories must have the undivided services of at least one instructor.

(*f*) Every forty students working in the technic laboratories must have the undivided services of at least one instructor.

(*g*) No persons except those holding the D.D.S., M.D., or bachelors' degree or equivalent, or who hold a license to practice dentistry, shall be employed as instructors.

Laboratories and Other Facilities.

Sec. 5. (*a*) The school must be possessed of the following number of laboratories and class rooms, equipped in the following manner:

(*b*) One chemical laboratory equipped to adequately teach qualitative, quantita-

tive, general inorganic and organic chemistry, and physiological chemistry.

(*c*) One microscopical laboratory equipped with sufficient high power microscopes so that each student may be possessed of the use of a microscope when he is working in the laboratory.

(*d*) Sufficient classrooms—at least one of which must be equipped with a lantern for projection.

(*e*) Sufficient technic laboratories, so that each student in attendance is provided with an individual place for laboratory work.

(*f*) A dental infirmary, equipped with a sufficient number of dental chairs to adequately serve the senior class. An efficient equipment for sterilizing students' instruments must be provided.

(*g*) An X-ray outfit for use in conjunction with the dental infirmary.

(*h*) A dental library constantly available to the students, which shall have at least twice the number of volumes as there are students enrolled in the school.

State Board Record.

Sec. 6. The school must not have more than 25 per cent. failures before the various state boards more than two years in succession.

Attendance.

Sec. 7. The record of attendance required of students must not be less than 85 per cent. for each year.

Promotion of Students.

Sec. 8. (*a*) A student who has incomplete course conditions, or failures, in 60 per cent. of his course for any semester shall be dropped.

(*b*) A student may not be promoted if he has incomplete conditions or failures in more than 20 per cent. of the course of any year.

(*c*) A student who fails to remove a condition or failure within twelve months from the time it was incurred shall automatically be dropped from the school.

(*d*) An incomplete course is one that has not been completed because of illness or other personal emergency.

Passing Mark, Conditions and Failures.

Sec. 9. (*a*) The passing mark shall be 75 per cent.

(*b*) A grade between 60 and 74 per cent. is defined as a condition.

(*c*) A grade below 60 per cent. is defined as a failure.

(*d*) A condition may be removed by examination.

(*e*) A failure may not be removed except by repetition of the course in part or entirely, *i.e.* by additional work under instruction approved by the dean or the professor in charge of the subject.

(*f*) A condition which is not removed within thirty days of the opening of the next year automatically becomes a failure, and can then only be removed by a repetition of the course.

(*g*) If a school grades by letters it shall state (publish) definitely the percentage range value of each letter used in designation of standings.

Class "B" Dental School Defined.

Schools which in certain particulars do not meet the requirements for Class "A," but may become eligible for Class "A" without complete reorganization.

Class "C" Dental School Defined.

Schools which could not meet the requirements for Class "A" without very extensive improvements and a complete reorganization. Class "C" schools shall be considered "not well-recognized dental schools."

Transfer of Dental Students.

Students of dental schools which have been well recognized, but have lost this recognition, may transfer to well-recognized dental schools, if acceptable to these schools. Such students may be accepted, as far as entrance requirements are concerned, on the requirements of the school in which the student began the study of dentistry.

The Dental Clinic in the National Army Cantonment.

By MALCOLM W. BAYLEY, Louisville, Ky.

THE first dental clinic set up and placed in operation at any military cantonment in the United States—that at Camp Zachary Taylor, Louisville, Ky., under Major Wm. Mann, D.C., dental surgeon in charge—expects to finish very near the top in the efficiency record competitive test inaugurated by the Council of the Association of Military Dental Surgeons, which was held from January 1st to March 31st. If this clinic does attain a high rank, it will undoubtedly be due to the system put into effect by Major Mann last November, the efficiency of which has been so apparent that a second clinic of the same type was opened about the first of March, while work was begun on a building for housing and operating-rooms for fifteen dental surgeons and enlisted men.

Major Mann's report to the War department for the month of December showed that 4929 operations were performed in the entire camp. The salary of the fifty-one dental surgeons then in camp for one month was $8500, which sum, divided by 4929, made the average cost of each operation $1.72 for the month.

At the same time, in the clinic, where eleven dental surgeons were employed, there were performed an average of 98 operations per day, or 2450, allowing twenty-five working days per month. The salary of the eleven dental surgeons in the clinic was $1833.37 for the month, which sum divided by the number of operations showed each to have cost the Government but 74 cents. Of course these figures of expense of operations do not include the cost of equipment or material. The difference in cost between the old and new methods was 98 cents.

Major Mann therefore said in his report: "It is evident from this comparison that under the present system the Government is losing at least half of the services of the commissioned *personnel* of the dental corps, which undoubtedly reflects on the administrative ability of the dental surgeon in charge. I therefore urge that this condition be remedied as quickly as possible."

The new clinics and buildings were the answer.

Unit No. 1, Camp Zachary Taylor, was keeping an accurate record of all the requirements demanded by the Association of Military Dental Surgeons' "efficiency test" before that competition was announced. Strict account is kept of the total hours on duty, the total days' leave, and total holidays. Account is taken of the number of amalgam fillings, cement fillings, extractions (roots and teeth), scalings, root-fillings, abscesses treated, putrescent roots treated, exposed or aching pulps treated, temporary fillings, gutta-percha or cement; and in addition the operations performed are classified, and records are kept of military conduct, neatness both of person and office, and as to how instruments are sterilized and property accounted for.

Each patient at unit No. 1 has a register slip which contains the patient's full name, rank, company, regiment or other organization, age, race, nativity, years of service, disease or injury, with location, complications, sequelæ, etc.; dates and nature of treatments and operations, results and remarks, and the name of the dental surgeon in attendance. The record from these register slips is transferred daily to the operator's daily record. A monthly report also is kept of each

operator, the figures being always at hand and up to date for the dental surgeon's service record.

The unit No. 1 clinic at first treated about 6000 men, increasing this to 10,000 when the organizations were filled. The organizations assigned to this clinic were the 334th and 335th Infantry, all trains —sanitary, supply, ammunition, military police, and headquarters—and 309th Engineers, headquarters troop, and signal corps. Attached to the first clinic were Lieut. Roy D. Gabbert, assistant in charge, and the following 1st lieuts.: Wm. H. Hatcher, B. B. Lowdenback, J. L. Rahm, H. R. Ludwig, Lee V. Sexton, Julius A. Altman, Wm. J. Barto, Joseph W. Golding, Howard Bock, and Louis M. Nelson.

The record of this staff for January 1918 was as follows:

	No.
Amalgam fillings	2860
Amalgam oxyphosphate fillings	611
Oxyphosphate fillings	3231
Root-canals filled	276
Synthetic fillings	178
Teeth extracted	1221
Treatments	1278
Calculus removed	1455
Pulps devitalized	94
Pulps extirpated	173
Prophylaxes	892
Dental caries	3938
Sittings	4355
Patients	2616
Total operations	9554

Crown and bridge-work operations, 73

The high mark was reached on January 24th, when 193 operations were performed by the eleven men in one day.

The Government is in no way niggardly with regard to the equipment of dental surgeons, the dental equipment at Camp Zachary Taylor being better than a great many civilian dental surgeons enjoy. An interesting description of the property at the first military dental clinic is given herewith by Lieut. Chester Denham, D.C., formerly of Cincinnati, Ohio. He says:

In times of peace, when a dental surgeon is assigned to active duty he usually finds his portable dental outfit awaiting him; if not awaiting him, it usually shows up at a very early date. Nearly all of the equipment furnished at such time was a portable or field outfit.

The reason the portable or field outfits were furnished in time of peace was because the dental surgeons were constantly being moved about from one post to another. As some of these posts would have only 100 or 200 men, and there being only one dental surgeon to every 1000 men, as allowed by law, it was impossible to have a dental surgeon stationed at every post. With this portable outfit it was comparatively easy for him to tear down and box up, so to speak, as compared to what he would have to do in moving a stationary or heavy equipment.

After war was declared we found that we had not sufficient equipment on hand to supply the needs of the large number of dental surgeons who had been called into the service; so the War department prepared a requisition which covered not only the portable outfits for field service, but stationary outfits for all the National Army and National Guard cantonments. The requisition was made on the basis of giving each cantonment its quota of dental surgeons sufficient to take care of the men stationed at each cantonment at any one time.

It was easy enough to make a list of the articles that we needed, but it was a different story when it came to getting the equipment. It was up to the Medical supply depot, New York, to let the contracts to various dental manufacturers, who in turn have been exhausting every available resource to fill them.

We have at present two dental units equipped and in operation, and the other two will be equipped as soon as the building is erected. [This has since been done. —Ed.] Each unit uses two electric dental engines, with folding wall attachments; ten chairs, ten fountain cuspidor and stand combinations, nine compressed-steel white aseptic cabinets, two electric sterilizers, one small and one large, these made so as to prevent them from burning out. There is one complete equipment for the exodontist for every unit, also a complete laboratory outfit for each unit, and a compressed-air equipment with connections through an electric switchboard to every chair and to the laboratory. There is an atomizer, hot-air syringe, and chip-blower connected with the compressed-air equipment attached to each chair.

We have in the way of instruments, Black's cutting instruments or excavators, Woodson's amalgam pluggers and the Cleve-Dent's plastic

pluggers, S. S. White's forceps and elevators, and Ivory's clamps; in fact, all of our equipment is made by the leading manufacturers of the United States. Our supplies are of the same high standard as our instruments, namely, cements, oxyphosphate, S. S. White; oxyphosphate of copper, black, Ames'; alloy, Caulk's Twentieth Century and S. S. White's True Dentalloy; Caulk's copper amalgam, and others too numerous to mention, of the same high standard.

We have been limited to the equipment and supplies of the "dental supply" table of the Medical Manual in making out our requisitions. There are some few things that we have been unable to get by requisition in the past, because they were not on the supply table, but this is now being revised, and we are endeavoring to have placed on this table such equipment as a nitrous oxid outfit, together with some bone-curets, Winter's chisels, Lecluse elevators, and other equipment and supplies that we find we may need in the future. And I am sure that we shall succeed, as the Government has been very liberal to us in the last few months relative to dental equipment, and I dare say will be just as liberal in the future.

In this connection it may be recalled that in the early days of the camp the Jefferson County Dental Association at Louisville came to the rescue of their brethren there by donating various instruments and burs for the use of the military dental surgeons before certain supplies had arrived. They also offered to do any soldier's work at half price, and invited the military men to bring to them any puzzling cases in which they might be able to render aid.

Major Mann, the dental surgeon in charge, is a great believer in amalgam as a tooth-saver and to make correct restorations. He insists that either amalgam or synthetic porcelain will outlast a gold inlay.

Lieut. Neil J. McCollum, D.C., of West Frankfort, Ill., says, in describing amalgam restorations, that until recently amalgam was the only permanent filling material on the "dental supply" table, but that recently there has been received some DeTrey's synthetic porcelain. Other materials, such as gold, porcelain crowns, and plate teeth are expected. Lieut. McCollum says:

Of all the permanent filling materials now on the market none has yet been found which is superior to amalgam. Where indicated and properly inserted, it is the restoration *par excellence*. When the dental surgeon, whether in the army or civil practice, does more and better amalgam work, more teeth will be saved. A smaller number of teeth will then have to be treated, for it is a fact that many pulpless teeth are not saved teeth. The slogan of the army dental surgeon should be to SAVE teeth.

All teeth with chronic infections are removed by us, for two reasons—first to remove the foci of infection, and second to save time. If the dental surgeon attempted to treat all these teeth it would require on an average four or five sittings, and according to statistics at least six teeth could be saved by the use of amalgam in the length of time required for the treatment of one tooth.

The present law provides one dental surgeon for every 1000 enlisted men, and I believe that the National army recruits will require, on an average, four fillings each. Practically every man requires oral prophylaxis. Then an army dental surgeon, in order to give the proper attention to each and every man under his command, would have to complete about thirteen fillings per day on an average, counting 300 working days in the year, to finish his work in this time. This is, of course, exclusive of any treatments or extractions that might be necessary, as well as work done for officers and for members of their families.

In preparing cavities for amalgam restorations, Black's eight rules of cavity preparation are carried out in every instance where practicable. We believe in the separation of all teeth before the filling material is inserted in approximo-occlusal cavities. In order to accomplish this at one sitting we use a very thin steel matrix in an Ivory or Detroit matrix retainer. By the use of a small wooden wedge at the gingival border, sufficient separation is made to give perfect contact when the matrix is removed.

The alloy is thoroughly amalgamated, with as little excess of mercury as possible. The filling is packed by the use of flat-faced instruments, both serrated and smooth. The use of a burnisher is prohibited on a newly inserted filling, as this will cause the mercury to come to the surface, which after a short time will become porous, thereby lessening the edge strength and affording lodgment for food particles. All fillings are carved to conform to the natural outline of the tooth as nearly as practicable, being careful always to restore marginal ridges, cusps, sulci, grooves,

etc. This is done by the use of sharp instruments, always carving from the enamel toward the filling.

As dentists all know, amalgam has always been unjustly abused by the majority of operators, and is looked upon by the laity as a cheap filling material, but I believe almost everyone will agree with me when I say that if the same length of time were spent upon an amalgam restoration as upon a gold inlay or gold filling, it would be superior to either.

Our amalgam restorations are all polished at subsequent sittings, unless it be the last filling for that patient, and in this case some time is allowed for crystallization, when the filling is polished, to avoid the necessity of the patient's returning for this one operation.

Lieut. John O. Lessig of Philadelphia, one of the dental reserve corps men at Camp Zachary Taylor, in speaking of the dental work done in the army, says:

We aim first to prevent dental lesions by prophylaxis, and the saving of teeth where practicable, rather than the restoration of missing ones. Here let me commend the civilian dental surgeons for the wonderful assistance they have rendered and are rendering the army by putting into shape the teeth of many of the new soldiers—especially the Preparedness League of American dentists. The President of the United States has said that every utility should be conserved and used in this great war. Dentistry is certainly a utility of the highest order. Dental surgeons have already rendered a valuable service in performing 136,000 free dental operations, furnishing the material free, for men now in the service.

More than 40,000 dental surgeons in this great country are rendering service, and what a wonderful service when we think back to July 1917, when we found that the 67th Regiment, New York National Guard, was the only organization of soldiers whose teeth had been put in perfect condition, ready for transportation across the Atlantic!

Dental treatment should be the same in the army as in private practice—careful and proper treatment no matter what the operation is. It should be given our most conscientious attention, and we should execute the work with the utmost care and skill we possess.

Let me say a word of commendation for those who have come into the Army Dental Corps. It is, indeed, a far-sighted and patriotic act on the part of a dentist to become an officer in the dental corps, for by so doing he has increased his measure of usefulness at the time when his country most needs him. At this time, if he be a true man, a virile man, he desires to be of the utmost service to his country. Many measure their success in the profession in dollars and cents, and I dispute not that every man should have a fair return for his labor. Be that as it may, true success, in or out of the army, lies in the cure effected, the relief given, and the restorations made in the oral cavity where caries of the teeth and other diseases have wrought great destruction.

CORRESPONDENCE

"Radiolucency of Chloro-percha."

To the Editor of the Dental Cosmos:

Sir,—I have just read in the May issue of the Dental Cosmos, and also in the April issue of the *Dental Review,* a communication by Dr. W. Clyde Davis relative to the reliability of the X-ray in the diagnosis of roots filled with the old-fashioned chloro-percha in use for the past twenty years. It contained statements which I confess were a surprise to me, and which prompted me to start my "machine" to see whether or not I had been misled by it for the past five years or more.

Accordingly I took a couple of extracted teeth, and without any particular preparation, except to see that I could carry a broach through the apex, I "pumped" my old-fashioned chloro-percha through the canal until it came out in the shape of a little ball on the end of the root. I am sending a radiograph (Fig. 1), and you can judge for yourself whether or not chloro-percha will show in the radiograph.

The radiograph was taken after the root had been filled for a couple of days and the chloro-percha had been allowed to dry.

The cuspid (Fig. 2) is one in which the root-filling consists of a mixture of the old-fashioned chloro-percha (rather thinner than usually employed) and the ordinary cement powder, and mixed to a thin pasty consistence, in which condition it is as easily worked into the canals as though it were simply chloro-percha.

Fig 1.

Fig. 2.

You will notice two places where the air was caught in the canal, due to the fact that I was in somewhat of a hurry, but the film clearly shows the filling, and by the way, there are no canal points in any of these fillings.

It seems unfortunate that statements of this character should be published so widely as this has been without first getting conclusive proof. Might there not be something wrong with the author's machine, or perhaps with his method of

developing? If I am wrong, I should be glad to know it, but I think I can see a filling in the roots, extending through the apex of the root, and collected in a little ball on the end of the root.

If this experiment is of any value you have my permission to use it as you wish.

Yours for better root-work,

N. A. DeWitt, D.M.D.

Cambridge, Mass., June 6, 1918.

Scurvy-like Pyorrhea at "the Front."

To the Editor of the Dental Cosmos:

Sir,—I have had occasion in my practice to see among the American soldiers here quite a large number of cases of pyorrhea alveolaris. The cases were of such a grave nature that they resembled more nearly scurvy than simple pyorrhea. I found the mouths of these men to be in very bad condition from the hygienic standpoint alone, so bad that it was sufficient cause to account for the gum conditions which I found. I know that in the United States there is an important movement for dental prophylaxis, and trust that by publishing this letter in the Dental Cosmos you will convey to the profession the necessity of at once sending to France a dozen prophylaxis nurses who could devote themselves to caring for our men here, who are very sadly in need of their services in very many cases. Surely this is a very small service to ask for our men, who stand so sorely in need of it.

Yours very sincerely,

D. S. Kritchevski.

Paris, France, May 25, 1918.

A Case of Ptosis as the Result of Pulpitis.

To the Editor of the Dental Cosmos:

Sir,—I would like to report a case that came under my observation while I was stationed at Camp Gordon, Ga.

A ptosis of the left upper eyelid, the onset of which was coincident with an acute attack of neuralgia, was traced to a pulpitis in the left upper second bicuspid.

The disappearance of the neuralgia was followed very closely by an abatement of the ptosis with a complete return to normal in less than a week.

None of those in charge of the eye and ear clinic had seen a similar case.

Respectfully,

Henry P. Wadsworth,
M.D., D.D.S., Lt.D.R.C.

Camp Merritt, N. J., July 8, 1918.

Proceedings of Societies

Academy of Stomatology of Philadelphia.

Monthly Meeting, Thursday Evening, May 16, 1918.

The meeting was called to order by the president, Dr. Jaquette, at 8.15 P.M.

The minutes of the last meeting and the report of the Council were read by the secretary and approved.

The Secretary read communications from the following, thanking the society for electing them to honorary membership: Dr. J. D. Thomas, Dr. H. C. Register, Dr. E. C. Kirk, and Dr. Thos. C. Stellwagen through his son. These letters were placed on file.

The President then called on Dr. L. A. Faught to read his paper, entitled "Non-cohesive Gold."

[This paper is printed in full at page 685 of the present issue of the Cosmos.]

Dr. Otto E. Inglis then read a paper entitled "A Comparison of Office Policies, with Special Reference to Pulp Exposure or Death."

[This paper is printed in full at page 692 of the present issue of the Cosmos.]

DISCUSSIONS OF PAPERS BY DRS. FAUGHT AND INGLIS.

Dr. H. C. Register. Dr. Faught has given us a most interesting paper on a very old subject, one that appeals to me, however, as being always new, because it continues to mean so much to both the operator and the patient. From clinical observation there is reason to believe that the results obtained from non-cohesive gold fillings are absolutely dependable, providing the cavities are formed along anatomical lines.

I have seen many fillings of the operators of long ago doing continued service for upward of three-quarters of a century; and I have a few of my own made by this method, still "holding the fort" after forty-odd years of service. I shall endeavor to show how non-cohesive gold foil in the form of cylinders and tape saves teeth, and why it appeals to me as being the one universal method to use where gold is indicated.

Gold does not undergo any physical or chemical change in the mouth; it is compatable with living structure, and when used in non-cohesive form for filling teeth its thermal conductivity is lessened and the vital dentin is stimulated to throw out a plasma, which seals the tubules, and this in turn also acts as a non-conductor; also, packing the gold in this form saves time in the construction of the filling, and protects the margins against mechanical injury while filling.

Of course the laws leading up to such a consummation must be observed. We meet with many cases of natural secondary dentin protection in cases of accidental exposure or mechanical attrition where the conditions are favorable. I recall a case where the entire enamel of the labial surface of the upper left central incisor and a part of the lateral were destroyed by the chemical action of a "sour drop" remaining on these surfaces over night. The patient pushed the acid candy there with his tongue, and went to sleep. This was practically a case of acute erosion. The merging of the enamel endings into the

dentin clearly defined the two kinds of structure, and brought to view the striated appearance of the dentin as viewed through a strong magnifying glass, presenting the most beautiful living specimen of these tissues I ever saw. I watched the formation of secondary dentin change a most sensitive surface into one that was horn-like and insensitive.

Gold fillings, cohesive from start to finish, are in my judgment unreliable for very long service, on account of the injury to the tooth, especially the dentin, in placing the filling.

Porcelain and pure gold inlays may add longevity to carious teeth when a long-service insoluble cement is found, for the cement in this class of work is the material that saves the tooth. Gutta-percha is quite limited in its application but a most compatible material, while the cements are all temporary.

Probably seventy-five per cent. of the teeth filled are filled with amalgam. Of this total probably twenty-five per cent. give a service of ten years. Ten years is not a long service, yet it proves that alloy fillings will save teeth aided by the protection of this same deposit of plasma by the dentin fibrils. When we get a perfectly balanced, chemically combined amalgam that is unchangeable, we shall have still better results.

So we are left the one method as demonstrated in actual service for making fillings which will last three-quarters of a century or more, namely, soft or non-cohesive gold in the form of cylinders and tape as described by Dr. Faught. I think Dr. Faught is in error regarding Abbey's non-cohesive gold foil remaining non-cohesive under all conditions. Dr. George Ellis demonstrated to me many years before his death that by annealing each leaf separately on both sides to a cherry red the surface treatment given the foil in its manufacture was burned off, and the foil regained its cohesiveness.

Dr. Inglis' paper fits into Dr. Faught's, the two forming an interesting symposium upon early treatment.

He calls attention to the importance of early discovery of cavities, and their immediate filling, even to pinhead cavities. This in my judgment is wise treatment, and non-cohesive gold in the form of cylinders and tape is the best material for such restorations.

Dr. Inglis also calls attention to the use of the electric mouth lamp in locating approximal cavities. The use of the electric mouth lamp has given me much satisfaction in this class of examinations. By using a black muslin cover thrown over the heads of patient and operator, thereby excluding the light—practically a dark-room—the electric lamp, exposed on one side only by using a guard, illuminates the teeth so perfectly that any carious spot present in the incising teeth —from cuspid to cuspid—is immediately brought to view.

In large breaks in bicuspids and molars some experience is required to note the absence of the natural translucency, but the discolored border and knuckling contact show up immediately.

Many cavities thus found are very extensive, and yet are passed over without detection by the ordinary examination with an exploring needle. Many approximal cavities thus discovered necessitate cutting through the occlusal wall, thereby forming a compound cavity. I will briefly outline my method of restoring a complicated cavity with non-cohesive and cohesive gold combined. The cavity is formed with a flat base at the cervical wall. Do not undercut near enamel, for enamel thus treated is limitedly devitalized—and this, in my judgment, is largely the cause of so many failures of fillings at the cervical margin.

The buccal and palatine cavity walls are slightly beveled outwardly, thereby retaining the enamel rods in normal strength from periphery to dento-enamel junction. The cavity in the occlusal wall is terminated in a dovetail anchorage spreading laterally, with straight walls extending through the whole depth of the enamel to the occlusal step, and at times slightly grooved in the dentin.

Extensive molar contours may receive two grooves, one on each side of the cavity from tuberosity to dentin in alignment with enamel rods, made with a fissure bur to half its width. A planished copper matrix, sufficiently wide to include the cavity from the cervical wall to

just within the contact point with adjoining tooth, is ligated to the tooth and burnished from the inside to contour form against the adjoining tooth. If the dentin is sensitive or the pulpal wall thin, the dentin is given a coating of para-chloro-percha. This immediately relieves all irritation of the exposed dentin, and obviates thermal shock. The cylinders are laid on the cervical wall with one end in contact with the pulpal wall, and the other end against the matrix.

The cylinders are placed with special pliers in regular order, and packed under a pellet of bibulous paper with special pliers and hand pressure, and later with a plugger in the mechanical mallet, until the cavity is filled even with the occlusal step. This is quickly done; then several pieces, as required, of mat gold unannealed are packed over the entire gold floor and into the occlusal dovetail, this being followed by several layers as required of annealed cohesive mat gold, carefully packed by hand and mallet force. Rolled cohesive gold from No. 30 or 60 up to 120, cut in size to easily lie in the cavity, is now used.

The gold is laid in laminæ from the locking dovetail to the adjoining tooth, and packed as tightly as possible. This slightly wedges the teeth apart as the packing is done, and sufficient space is gained to allow a Gordon White saw to pass through the excess, permitting complete finishing, and return of the tooth to its knuckling contact. This latter part of the work is most advantageously done a few days later, as the teeth having responded to the wedging process do not constantly spring together during the finishing. The death of the pulp seems likely to spell the doom of a tooth, first, because of the tooth's physical inefficiency to maintain itself—and consequently disintegration, aside from caries, takes place; and second, the septic foci formed by decomposition of the organic matter, which includes the pulp and one-third the dentin, are in the light of recent investigations likely to force extraction in spite of apparent comfort.

Devitalization and disintegration are synonymous terms as applied to devitalized teeth, and until original research points a way to safe treatment of root-canals, we must bend our effort toward pulp conservation.

Dr. Inglis. In approximal cavities in incisors I occasionally use a combination of non-cohesive and cohesive gold. The gold is used in ropes or tape packed so as to fill an entire angle from the pulpal wall out, each mass being thoroughly condensed. Successive masses so packed finally leave an accessible unfilled concavity into which cohesive gold is placed as a key to complete the filling. This is much easier than to attempt to turn in non-cohesive gold with the small pyramidal plugger used for that purpose.

Dr. S. B. Luckie. I have not had as much experience with non-cohesive gold foil as my friend Dr. Faught has, although we probably entered practice at about the same time. I did for many years, however, at the suggestion of Dr. Bonwill, use Abbey's foil, both the non-cohesive and the cohesive. In seeing Dr. Bonwill operate, I learned that he could put in contour fillings with Abbey's non-cohesive foil. I attempted it, and feel that I succeeded very well; but my principal success has been with the two kinds of gold, the non-cohesive in the cervical portion of the cavity, and the cohesive for the buccal and labial walls and the remaining portion of the cavity, somewhat as described by Dr. Inglis. In the use of non-cohesive gold foil, there is no doubt that it is more compatible with the dentin than cohesive gold, which is more stubborn, and requires more force to adapt it to the walls of the cavity. By lining the cavity with the non-cohesive gold, as brought out by Dr. Register, the dentin has an opportunity to heal.

In regard to Dr. Inglis' paper, I think the whole gist of it brings us right back to the fact that we must practice prophylaxis. We must not only practice it, but teach the importance of it. As for educating the public, as suggested by the essayist, I do not think the method proposed would be a successful one. It appears to me that if the laity will not listen to the words of the family dentist they would hardly be influenced by what they might read in the public press. It

is a method that has never been tried, and no doubt it is worthy of a trial. I think it would be well if the society would take it up, in a systematic manner, as suggested in the paper, with the hope that it would result in educating the mass of the people to appreciate prophylaxis.

Dr. R. E. Denney. Dr. Luckie spoke rather disparagingly of the plan of spreading information among the public by means of pamphlets. My brother and I have a common waiting-room. He is an oculist, and has pamphlets containing certain information about the eye on the table in the waiting-room, and I find that nearly all of my patients come into my office with one of these pamphlets in their hands. I find that people are very keen about getting any information they can concerning themselves, and I believe the plan Dr. Inglis suggests is a very good one. I think we are all too much afraid of doing something that would be considered unethical, and are inclined to let the newspapers and magazines do the educational work that we should do.

Dr. F. D. Gardiner. I never could see much use in discussing which kind of gold is the best to preserve teeth. The kind of gold used should depend entirely upon the skill and preference of the operator. If he is more skilful in the use of non-cohesive gold than he is in the use of the cohesive, he will succeed best with the non-cohesive, and *vice versa.* He should be equally skilled in the use of both. In that case he can use both forms, either singly or combined. He ought to be able to avail himself of the advantages of all forms of gold.

I have had rather an extensive experience with the use of non-cohesive gold entirely in the same operation. I have also used it in combination with cohesive gold, and I have used cohesive gold exclusively. I could do just as good work with one form as with the other. I have used the crystalline form, and equally good results can be obtained with that. It makes no difference whether cohesive gold can be made "soft" or not, if it is soft when you use it. Any cohesive gold, no matter how cohesive it is, if exposed to the air and allowed to become stale, will become soft or non-cohesive, and you cannot make it cohere without annealing. One who is going to use gold should become skilled in the use of all forms, because each one has its place. There are many operations that can be performed with cohesive gold that could not be done skilfully with non-cohesive.

With regard to Dr. Inglis' paper, undoubtedly the practice of the future should be that of prevention. My practice has been gradually drifting into preventive treatment for nearly twenty years, and I never obtained as gratifying results before as I have obtained since I adopted the practice of prevention. Disease can be prevented if we are only willing to take the trouble to do it, and are thorough and systematic enough.

Dr. Geo. F. Logan. Dr. Faught said he was going to read a primary paper. As far as soft gold is concerned, my experience is so primary that I do not think I shall discuss it at all. I am glad he mentioned the care we should take to avoid injury to the enamel prisms. Dr. Register emphasized this point. I believe that if we primary gold workers have more success with inlays than we had with the old method, the success is due to the fact that the former method enables us to avoid injuring the margins of the cavity.

Dr. Inglis mentioned educating the public. That is an interesting subject, but I think he begins at the wrong end. It seems to me that the school is the place to educate the public. The teacher speaks with an authority that the newspaper, the magazine, or even the dentist cannot. The child accepts what the teacher says as final. It is an insidious method of impressing upon and implanting into the minds of the children a fact that grows up with them. I think with very little effort we could interest the school boards, and have this work done through the schools. Instead of using textbooks on hygiene that instruct children not to use pins with which to pick the teeth because they scratch the enamel, let us get authority to revise the textbooks, and tell them something about the first molar, etc. I have had mothers

send children to have the first molar extracted. When I sent the child back with the information that it was a second tooth it was met with the positive statement that it was not, and the child was sent back to me. The present textbooks on hygiene say practically nothing about vital dental subjects. I think there is nothing that could be taught through hygiene that is more important than the care of the teeth. Children can help to take care of their teeth. It is all very well to instruct them about the other organs, but they cannot make use of their knowledge to take care of them. They must go to the physician.

Dr. Wallace wrote a small book a few years ago in which he claimed that proper preventive measures would actually prevent caries. The book caused quite a stir in the profession at the time it was published. I think that Dr. Wallace was a little over-enthusiastic, but his suggestion was a long step in the right direction.

Somebody mentioned root-fillings. Dr. Register called attention to the 33⅓ per cent. of organic matter in dentin. There has been a great deal of discussion as to the possibility of destroying bacteria in the tubuli of the dentin. Some claim that there are no bacteria there. We know that there are tubuli, and that there is pabulum in them. The sodium-potassium method is very effective, but it seems to me that Dr. Howe's method is the better to sterilize the dentin. We can close up the apical foramen and force the silver nitrate and ammonia into the tubuli by pressure—of course, if the shade of the tooth is unimportant because of its position or condition.

Dr. A. Kassab. With regard to Dr. Inglis' paper, I would say that with our present knowledge of the relation of infection of the teeth to systemic diseases, I agree heartily with him about educating the public by articles prepared by the state or the national dental society. During the last month an article was published in one of the magazines entitled "How I Found Health in the Dentist's Chair," and I think that within one week it was mentioned to me by my patients more than half a dozen times. This shows the people are anxious to get something that will help them in securing good health if they do not have it; or in taking care of it, if they do. The school is the place where children should be taught oral hygiene; but who can teach them? Many teachers are ignorant of the principles of it. In our town, through the efforts of Dr. Luckie, we have secured a set of slides, and a committee has volunteered to spread information in the schools throughout Delaware county. Permission was obtained for the members of this committee to go into the schools before the pupils from the fourth grade up, and speak to them about the importance of oral hygiene. You would be surprised to know how many, not of the children, but of the teachers, would speak to us afterward and say that they had not known these things. If they did not know them, they could not teach them. Until the time comes when the teachers receive instruction in this subject, they cannot teach it; and I agree that any method that can bring before the public the importance of saving the pearls which nature has given them is of value, because I believe that on their health depends, to a great extent, the health of the individual.

Dr. Logan. In answer to the objection of the gentleman who has just spoken, I would say that if this information were embodied in the textbooks and therefore a part of the course, it would be the teachers' business to know about it. It would be an easy matter to revise the textbooks and give the information to the teachers in that way.

Dr. Inglis. The school is the place for the child to learn oral hygiene, but there are millions of people not in the schools who are present or prospective patients. Something should be done to educate these people, and the constant presentation to them of authoritative knowledge through the medium suggested should finally move them into such action as will make prophylaxis possible. As it is, we get the consequences of neglect.

The readers of the papers received a vote of thanks. The meeting adjourned at 9.25 P.M.

Bibliographical

Essentials of Laboratory Diagnosis. Designed for Students and Practitioners. By Francis Ashley Faught, M.D., Director of the Laboratory of the Department of Clinical Medicine and Assistant to the Professor of Clinical Medicine, Medico-Chirurgical College, etc., Philadelphia, Pa. Sixth Edition, revised. Philadelphia: F. A. Davis Company. 1917.

It is unlikely that this admirable work will find a place in the library of many dentists. It deals with a subject which is distinctly outside the province of dental practice. This does not mean that the study of the pulse, the blood-picture, uranalysis, and many bacteriologic methods are immaterial to an efficient and successful treatment of oral and dental lesions. It means simply that the subject is so complex and so intricate that the dentist cannot afford to train himself to make many of the tests accurately or to interpret the results rationally. He must refer this work, as does the general practitioner, to the specialist.

From a dental standpoint, the book needs enlargement of the section on the chemistry of the saliva, and a special section on the collection of material from oral infectious foci for bacteriologic examination. From the general standpoint, this work is very complete, concise, and clear. The print is large; the size, form, and make-up of the book facilitate convenience of usage, and in particular the table of contents and the index make reference easy and rapid.

General Pathology and Bacteriology for Dental Students. By Guthrie McConnell, M.D., Director of the Clinical and Roentgenological Laboratories of the Waterloo Medical Society, Iowa, Capt. M.R.C., U. S. A., formerly Professor of Pathology and Bacteriology in the Philadelphia Dental College and in the Medical Department, Temple University; formerly Demonstrator of Pathology, Medico-Chirurgical College of Philadelphia; formerly Assistant Demonstrator of Histology, University of Pennsylvania, etc. Second Edition, revised. Philadelphia and London: W. B. Saunders Company. 1918.

This little book is designed for two groups: First, practitioners of dentistry who received their training before the modern, fundamentally medical viewpoint was appreciated; second, dental students. For the former group this book may be extremely desirable. A short, concise, simple exposition of pathologic facts and concepts must make this group more valuable in its service to the community.

For the latter group, dental students, the value of this book is questionable. Undoubtedly it will enable them to pass the "state board" examination, but will they have from it as deep, as real, as comprehensive a "pathologic sense" as will that student who has in addition to laboratory work and lectures made collateral reference to the more elaborate texts? The student who is to practice dentistry admittedly needs different

training from that given to him who will practice general medicine, obstetrics, or abdominal surgery—but the point of divergence lies after, not before the instruction in general pathology.

A critique of this book ultimately resolves itself into a consideration of this whole class of books—books which are intermediate between the more complete, scholarly textbooks and the totally inadequate "quiz compend." If it be admitted that there is a place for such an "intermediate" book, then in this one the treatment of certain subjects, as inflammation, bone diseases, and the streptococci—subjects all of high dental interest—stands out as particularly insufficient.

Books Received.

Books received are acknowledged in this column, and such acknowledgment must be regarded as a sufficient return for the courtesy of the sender. Selections will be made for review in the interests of our readers and as space permits.

"Electrolytic Medication (Ionization)—Theory, Technique, and Clinical Applications." Published by the Ritter Dental Mfg. Co., Rochester, N. Y., Chicago, Philadelphia, New York. 1918.

"How to Keep Well?" [Polish.] A Popular Textbook on Oral Hygiene, Descriptive and Instructive. By W. Nalencz-Koniuszewski, D.D.S. (Published for the benefit of the three million Polish-speaking Americans.) Chicago, Ill.: Polish Peoples Publishing Co. 1917.

"An Investigation of the Methods of Disinfection as Carried Out in Dental Offices." By Adah Roberta Holmes, B.A., M.A., Research Laboratory, University of California and California State Dental Association. Reprinted from the *Journal of the California State Dental Association* of March and April, 1918. [Pamphlet.]

"Congreso Dental Pan-Americano de Chile." Celebrado en Octubre de 1917. Santiago de Chile: Imprenta Universitaria, Bandera 130, Santiago. 1917.

"Dental Physiology and Oral Hygiene." By David Stanley Hill, D.D.S. First Edition, illustrated. Effingham, Ill.: The LeCrone Press, 1917.

"Nine Humorous Tales." By Anton Chekhov. Translated by Isaac Goldberg and Henry T. Schnittkind. Boston: The Stratford Company. 1918. Price 25 cents.

"Interpretation of Dental and Maxillary Roentgenograms." By Robert H. Ivy, M.D., D.D.S., Major Medical Reserve Corps, U. S. Army; Associate Surgeon, Columbia Hospital, Milwaukee; formerly Instructor in Oral Surgery, University of Pennsylvania. With 259 illustrations. St. Louis: C. V. Mosby Company. 1918.

"Qualitative Chemical Analysis." A Laboratory Manual of Qualitative Chemical Analysis. By A. R. Bliss, Jr., M.D., Ph.G., Professor of Pharmacology, School of Medicine, Emory University, Atlanta, Ga.; formerly Professor of Chemistry and Pharmacology, Graduate School of Medicine, University of Alabama. Second Edition, revised and reset; 194 pages with working tables. Philadelphia and London: W. B. Saunders Company, 1918. Cloth, $2.25 net.

"Army Dentistry." Forsyth Lectures for the Army Dental Reserve Corps. By Frederick A. Keyes, D.M.D., former Visiting Dentist, St. Vincent's Orphanage, Boston; Consulting Dentist, State Hospital, Medfield, Mass.; Librarian and Curator of the Museum, Forsyth Dental Infirmary, Boston. New York and London: D. Appleton & Co. 1918.

Review of Current Dental Literature

[*Lancet*, London, April 20, 1918.]

The Modern English Skull. By F. G. Parsons.

The dentist in general and the orthodontist in particular realize the correlation between the teeth and the facial contours and profiles. Perhaps it is not yet fully appreciated that the definition of the norm is an indispensable prerequisite to the study of such correlation, or that this definition has by no means been yet accepted by the anthropologist. The problem in England is infinitely simple compared with the problem in this country, whose basic complexity has for so long a time been signalized by Boas.

Parsons introduces his considerations with the comment that it is a curious thing that one of the skull forms of which we know the least is that of the modern Englishman. The reason, of course, is that we so seldom have the opportunity of studying it, since all the skulls in our dissecting rooms are cut to pieces, while those which we use in the lectures are collected from various parts of Europe. There are, however, in London a few skulls the identity of which is known, and one or the other of these is often used as the type of an English skull, though not always the same one. Parsons proposes to make a short study of these skulls with the view of determining whether they may all be regarded justly as typically English.

After a very technical anthropometric survey he accepts the prosaic and likely fact that the modern Londoner differs wonderfully little in his head form from his Saxon ancestor, except that he has lost 2 or 3 mm. in his skull length. In England, as in Norway, the brachycephalic, Alpine, or Slav blood has not had the chance of superseding and stamping out the Nordic, which it has done, if German prisoners are any test, throughout the greater part of Germany.

[*New York Medical Journal*, March 30, April 6, 13, 20, and 27; May 4 and 11, 1918.]

The Treatment of Hemophilia. By Louis T. de M. Sajous.

Hemophilia is one of the big, ingrained fears of the dental profession. In the first place it is well to recognize that clinically hemophilia does not correspond with a pathologic entity. It may be due to deficiency in available calcium in the blood: to infection, as *e.g.* in the melena neonatorum; it may occur in hepatic cirrhosis. However, in its strict sense this term may be limited to that constitutional hereditary defect which in general is sex-linked, and which follows a modified form of the Mendelian law. This seems to be characterized by a delay in the coagulation time in the initial step of coagulation, which initial step normally is "a rendering of the platelets available by some process like solution." The platelets, while normal in numbers, seem abnormally resistant, and do not give up their prothrombin readily enough. Hemophilic blood plasma is thus likely to contain only minimal amounts of dissolved prothrombin. From this viewpoint, the rational treatment of hemophilia would consist, under emergency conditions, in supplying at once artificially the lack of prothrombin, and during the intervals between hemorrhages, either in promoting the formation of less resistant platelets or possibly in supplying some agent which would hasten their dissolution.

For convenience this discussion may be divided into seven different headings, each of which is concerned with some form of treatment. These are (1) administration of calcium in one form or another, (2) administration of gelatin, (3) administration of normal blood serum, (4) administration of defibrinated human blood, (5) the transfusion of human blood, (6) the introduction of organic coagulating principle or principles

lacking in the blood of hemophiliacs, and (7) local treatment.

(1) In general, the consensus of opinion today inclines to the view that the administration of calcium chlorid or lactate does not definitely lessen the tendency to hemorrhage. This is accounted for by the now well-known fact that in these cases calcium is nearly always present in normal amount in the blood. However, for a small minority of hemophiliacs this form of treatment is indicated.

(2) A number of years ago it was thought that gelatin exerted a definite effect in arresting obstinate hemophilic bleeding. Where it is to be introduced hypodermically, specially prepared sterile gelatin should be employed. The solution used may be of 1 to 10 per cent. strength, preferably the latter. It has been specified that not less than 2 gm. be given at a dose. On the whole, it must be recognized that systemic use of gelatin is by no means a certain therapeutic measure, though sometimes good results follow, at least temporarily.

(3) Much more efficient than the two above methods has been the use of normal blood serum. In the therapeutic administration of serum the difficulty is met by the injection of ready-formed thrombin—which remains in serum after clotting—and this is seemingly the chief feature of utility in such a procedure. An artificial, extraneous coagulating power is thus conferred on the blood in a manner analogous to the induction of passive immunity by injection of immune serum. Fresh serum from any mammalian species seems to be effectual, though it is advisable that sera from the ox and dog be avoided, as being more likely than others to induce toxic symptoms. The most potent sera have been found in the order of their efficacy to be human, rabbit, and horse sera. The dose of serum given subcutaneously ranges from 10 or 15 mils in a mild case or young infant to 30 or 50 mils in a more severe case or older child. At times one or two doses suffice to control severe hemorrhage. In urgent cases the injection may be repeated at intervals of 4 to 6 hours, while in other instances injections may be appropriately given once daily, or until no new hemorrhages have taken place for 24 hours. Intravenous administration of serum has occasionally been carried out and may of course be expected to yield results even more prompt than those following hypodermic use. The dosage is smaller, viz, 10 to 20 mils in the severe cases. Apparently but little trouble has been experienced from anaphylactic symptoms; although upon the slightest indication of these symptoms the kind of serum used should be at once changed. However, this method of treatment yields more complete results in cases of sporadic or accidental hemophilia than in the cases of true or hereditary hemophilia. In default of fresh serum, regular antitoxin sera, especially diphtheria antitoxin, have been used, often with satisfactory results, whether injected or applied locally.

Injection of serum on the day before an operative procedure in a bleeder has repeatedly yielded successful prophylactic results.

(4) Defibrinated human blood has been substituted by some for serum. From the standpoint of coagulation it is probably but little, if at all, superior to serum alone.

(5) From the standpoint of recorded clinical observations the effects of whole blood transfusion seem to have been slightly superior to those of procedures (3) and (4). On the whole, blood transfusion, in comparison with serum administration, may perhaps be held especially indicated in the more severe cases, though the circumstances attending the individual case might easily outweigh other considerations.

(6) This group includes quite a miscellaneous assortment: raw meat juice, cephalin, a solution asserted to contain the thrombokinetic substance in nearly its pure form in addition to the pro-ferment prothrombin, Witte's peptone, and organ extracts. Among the latter, thyroid medication seems advisable in the entire group of "bleeders." Over serum or blood treatment this measure has obviously the advantage of greater ease of application. Ovarian extract has been advocated for these conditions, although the results on the whole do not seem to have been as favorable as those obtained with thyroid preparations.

(7) Under the heading of local treatment are included a number of distinct ideas. Ordinary hemostatic agents, as ferric solutions, stypticin, antipyrin, etc., together with local pressure, seem useless generally. Calcium chlorid, gelatin, or adrenalin solutions, while

sometimes effectual, cannot be resorted to invariably. Thermocautery has been used successfully as a last resort in a case of bleeding from the gums. The best local methods are, as in the constitutional treatment, those that overcome the specific deficiency in prothrombin or thromboplastic substance, which is responsible for the delay in coagulation at the bleeding point.

Mere kneading of the tissues surrounding the site of hemorrhage has at times proved sufficient to arrest the flow. Such results are accounted for on the assumption of a liberation of an additional amount of thrombokinase from the kneaded tissues, much larger quantities of the kinase being required to induce rapid clotting in hemophilic than in normal blood.

A few drops of the practitioner's own blood or of normal blood from another person will frequently arrest the hemorrhage. Fresh normal blood serum used in a dressing over the point involved, after cleansing the latter, exerts a powerful coagulating influence. For intranasal hemorrhage or bleeding teeth in hemophiliacs, serum is likewise appropriate, applied in the manner usual in these situations.

Fresh goiter tissue material—parenchymatous, hyperplastic thyroid material, not cystic or colloid goiter tissue—has been advanced as the most effectual local hemostatic for hemophilic hemorrhage.

An extract from the fresh liver tissue of rabbit or other animal has been advised as a source of thrombokinase. Extracts of testis, thymus, ovarian tissue, as well as of spleen and lymph nodes, also cephalin, have been used according to various reports with some clinical success.

In all but the mildest cases combined local and systemic measures are advantageous, the former having for their purpose to check the bleeding immediately, while the latter assist in preventing recurrence, and, if necessary, reach sites of hemorrhage inaccessible to direct remedial applications.

[*Journal of the National Dental Association*, June 1918.]

A New Continuous-Gum Set. By Frederick H. Nies.

The continuous-gum set is too artistic a piece of work to pass away, but despite its obvious beauty, its natural appearance, and its cleanliness, it has been passing. One who is sensitive to the modern trend of dental thought realizes that there is at present a far larger field of usefulness for dentures than there has been for many years. Nies has made a unique improvement in continuous-gum construction, in that he has divided it into two parts instead of one whole. This simplification and standardization of the old method will do much toward encouraging practitioners to adopt a procedure which admittedly is without peer.

The central idea of Nies' modification is that the plate and teeth are separate. An impression is taken by a modification of Greene's method. The muscle-molded impression gives a cast on the die of which it is possible to swage a plate that does not impinge on the muscles or frenum, that causes no discomfort, and that clings firmly to the roof of the mouth. This is highly important in a continuous-gum set, which cannot well be trimmed after the porcelain is fused. The base-plate is made as usual, and from this the bite is adjusted. All-porcelain crowns, fitting over iridio-platinum posts, are then ground to articulate. These crowns sit in platinum cups, which in turn are soldered to the base-plate. Nies draws a seamless cup. The neck of the crown is measured with thin wire. A mandrel is chosen to fit the wire measurement. With the aid of a steel draw-plate a platinum disk is drawn down to a cup fitting the neck of the crown snugly, and corresponding in size to the wire measurement. From an impression of the crown a die is made of Melotte's metal, and the platinum cup swaged over it. This is a tedious process, and at present suitable cups can be secured on the market.

In the discussion L. E. Custer suggests the following substitute method for making the cups: Take a 30-gage dead-annealed platinum wire, wind it around the neck of the tooth three, four, or five times according to the desired depth of the cup. Remove the coil, place it upon a sheet of platinum, and, using a piece of Ames' solder, solidify the platinum coil into a seamless band, at the same time uniting it to the sheet platinum forming the bottom of the cup. Such a cup possesses an advantage in that it presents a corrugated surface on the outside for better attachment

to porcelain, and on the inside for the cement.

Each cup is now placed on its crown, carefully burnished to it, and trimmed. A post-hole is cut, and the post that was originally fitted during the setting up and articulation of the teeth is now forced through into the crown to a suitable depth. The post and platinum cup are firmly waxed together, invested, and soldered with high-fusing platinum solder. When this is done, the posts and cups are fitted upon their corresponding teeth, and the whole is adjusted to correct position on the base-plate with wax. The porcelain crowns are carefully removed, the posts, cups, and plate invested and soldered. The crowns are now reset in the platinum cups and coated just above the cups with oil to prevent adhesion of the porcelain body which, moistened with dextrin, is now applied. The application of the porcelain, its carving and baking, is now done as usual. When this is done, the crowns are cemented in place, preferably with Protosyn or with oxyphosphate or red sulfur.

This method lends itself easily to meet special conditions. For instance, where there has been local or general resorption of the alveolar process, at such areas the platinum cups may be raised as needed above the base-plate by means of varying lengths of iridio-platinum posts. In these cases additional reinforcement should be added. One way is by inserting a strip of 28-gage platinum plate upright between the bottom of the cups and the plate.

The obvious advantages of this method are —(1) It is easier to adjust the teeth, to make corrections and repairs; (2) the strength and translucency of the teeth are not lessened by exposure to the extremely high temperatures of soldering platinum and fusing porcelain; and (3) the volume and weight of the finished denture are less.

[*Schweizerische Vierteljahrsschrift für Zahnheilkunde,* Zurich, 1917, No. 4.]

A Clinical and Bacteriological Study of the Reinfection of Root-canals, especially After Treatment with Tricresol-formalin and Peruvian Balsam-iodoform. By Marcel Cevey.

From many sides this article is admirable. The subject is important and opportune, it has been intelligently analyzed, and the study of its component problems has been carried out with painstaking industry. In spite of the volume of this research the legitimate conclusions are self-evident. Cevey was induced to take up this work by the many cases which returned unsatisfied after the treatment of pulpal gangrene with tricresol and formalin. This was in reality a phase of the larger problem, a reinvestigation of the view so emphatically presented by Mayrhofer, that our most powerful antiseptics, even after a successful enlargement of the canal with aqua regia, cannot destroy the bacteria harbored within the root-canal.

To secure valid results it was necessary to insure against reinfection of the canal from the saliva with its organisms seeping through the sealing of the dressing. The choice of such an efficient sealing was essential for Cevey's experimental work, but we must not overlook the fact that it can at once be extended into the field of practice. For such a sealing, simply zinc oxid mixed with eugenol suffices. This was suggested by Mayrhofer. This cement must be mixed quite thick, and the zinc oxid must be anhydrous, to insure rapid setting.

In brief, the method of investigation was as follows: The history and present condition of each tooth and of each case was noted. Diagnosis was made from the clinical data. A radiograph was taken, on the basis of which the original diagnosis was reconsidered if necessary. At the next visit a bacteriological examination was begun—a bouillon culture (aerobic), an agar tube (anaerobic), and a smear direct from the canal. The tricresol-formalin treatments were repeated until no growth appeared on the culture media, *i.e.* until the canal was "sterile." The canal was then flooded with a saturated solution of paramonochlorphenol, the excess of moisture absorbed on fibers of asbestos which had been heated to a glow, and then the canal was pumped full of tricresol-formalin paste or Peruvian balsam-iodoform. The entrance to the canal was then covered with a piece of asbestos and the cavity closed with the zinc oxid-eugenol cement. After two or three up to twelve months these cases were again studied in practically the same way as at the start; variants from this procedure were carried out. The consideration of the most significant of these can be taken up under the

discussion of the general summary of Cevey's work, which follows:

(1) Zinc oxid-eugenol fillings (sealings) can confidently be relied upon to prevent ingress of bacteria from the saliva to the root-canal.

(2) An infected root-canal cannot be permanently sterilized with tricresol and formalin. The first dressings are in many cases infected even on the second day.

(3) The results are the more lasting, the more frequently are the tricresol and formalin dressings inserted.

The above statements (2) and (3) are in harmony with the conclusion of Brooks and Price (DENTAL COSMOS, June 1918, p. 532), to the effect that the efficiency of a root treatment is greater a few hours after it has been placed in the tooth than after several days' or even one day's time. (See Cevey's "Table 47," p. 259.)

(4) The results of Cevey's investigations in general agree in so far as they concern the treatment of pulpal gangrene and pericementitis in their acute and chronic forms with the results secured by Mayrhofer. Neither the tricresol-formalin nor the Peruvian balsam-iodoform methods meet the requisites which must from a bacteriological standpoint be exacted in root-canal treatment.

(5) The canals which have been treated with tricresol and formalin dressings and which have been maintained sterile were filled with either tricresol and formalin or Peruvian balsam and iodoform. Both procedures give about the same results.

(6) A permanent sterility cannot with certainty be secured with either method. After six months to a year micro-organisms could still be cultivated from about 25 per cent. of the treated canals.

(7) On the other hand, roots treated in this fashion remain generally at least a year without clinical symptoms.

(8) The radiographs taken after each canal filling show that in most cases tricresol and formalin paste or Peruvian balsam and iodoform cannot be carried to the apex.

(9) The disinfection of infected canals can more rapidly and with greater certainty be accomplished by a combination of tricresol and formalin with chlorphenol-thymol in vapor form.

Inasmuch as this method proved itself the most efficient in Cevey's hands it will be desirable to describe it. The solution consists of equal parts of (1) saturated alcoholic solution of paramonochlorphenol and (2) a saturated alcoholic solution of thymol. After the tricresol and formalin treatment the canal is flooded with this solution. Then the fluid is vaporized by a long thin platinum needle by the thermocautery until the canal wall is completely dry and the patient feels a slight uneasiness, which indicates that the drying has been adequate. The canal is again moistened with the solution simply to facilitate the flowing of the tricresol and formalin paste into the canal for the permanent filling. Permanent filling with the Peruvian balsam and iodoform gave slightly better results. While this method proved itself better than the others tested by Cevey, still its results are by no means satisfactory. At best not more than 85 per cent. of the canals had escaped reinfection.

The relative success of this method is comparable with that of Cameron's (Brooks and Price, DENTAL COSMOS, June 1918, p. 532), by which at least as satisfactory clinical results are secured by the simpler technique of merely rapidly vaporizing a very dilute solution of formalin within the canal. The mode of applying disinfectants frequently to a large extent determines their efficacy, and it may be that the anatomical and chemical conditions as we find them in an infected canal demand the application of the disinfectant in a gaseous form.

Buisman (DENTAL COSMOS, September 1917, p. 929) has discussed the use of thymol as an agent for the filling of canals. In the April 1918 issue of the *Tijdschrift voor Tandheelkunde* he again takes up this topic. This article is mainly a critique, and contains little that differs from his former paper. However, he still maintains, within the limits already defined, that despite the occasional disappearance of thymol from the canal by sublimation (*cf.* Cameron's and Cevey's intentional vaporization) and possibly certain phenomena of irritation, his former favorable opinion of thymol is justifiable.

(10) In addition to pulpal gangrene simple cases of pulpitis were studied. A pulp was considered septic when, after the exercise of all aseptic precautions in removing it, it proved bacteriologically to be infected. Canals

from which have been extracted septic pulps should be treated just as are the cases of pulpal gangrene.

(11) Clinically it is impossible to distinguish between septic and aseptic pulpitis. Consequently a disinfectant treatment before canal-filling is to be advised in every case of pulpitis.

[*Journal of Experimental Medicine*, Baltimore, May 1, 1918.]

Behavior of Hypochlorite and of Chloramin-T Solutions in Contact with Necrotic and Normal Tissues *in vivo*.

Toxicity of Certain Widely Used Antiseptics. By J. Harold Austin and Herbert D. Taylor.

It has been known for some time that the chlorin content and consequently the potency of hypochlorite of soda solutions diminishes rapidly when in contact with the surface of wounds. The experiments were carried out upon lesions upon rabbit ears following exposure to the Coolidge tube. These ears were suspended, with normal ones, in (1) Dakin's hypochlorite solution of known strength, (2) an indifferent alkaline solution (sodium carbonate 1 gm. and sodium bicarbonate 17 gm. per liter of water), and (3) a solution of chloramin-T. After exposure to these solutions for varying lengths of time, the chlorin content was established by titration with sodium thiosulfate. Their conclusions follow: (1) The fall in chlorin concentration of Dakin's hypochlorite solution is more rapid in contact with necrotic than in contact with normal tissue. (2) The fall in chlorin concentration of chloramin-T solution is very slight when applied to necrotic tissue, and is negligible when applied to normal tissue. (3) The action of the hypochlorite solution on tissue results in the separation of particles of necrotic tissue, hair, epithelial scales, coagulated serum, etc., and a gradual digestion of these substances, taking place over a period of at least seventeen hours. (4) The fall in the chlorin concentration of the hypochlorite solution is not complete until the particles are completely dissolved. (5) Chloramin-T solution, 2 per cent., has no erosive effect comparable with that exhibited by the hypochlorite solution. (6) Repeated exposures to the three solutions show the hypochlorite solution to be superior in its cleansing ability on necrotic tissue. (7) The hypochlorite solution is much more irritating to normal rabbit skin than chloramin-T solution or the alkaline control solution. (8) Therefore the irritating effects must be due to the readily available chlorin.

The second of the articles by the authors is pertinent in view of the widespread use of certain antiseptics in the treatment of infected wounds. Consequently it would seem desirable to make toxicity tests on animals under conditions in which rapid absorption might be expected. While, as a rule, the antiseptics are employed under conditions that preclude the possibility of much absorption with consequent systemic effect, yet occasionally certain of them have been recommended, and in some instances even used for injection into closed cavities where considerable absorption might occur. The method of the present study was to inject increasing doses into mice intraperitoneally, and into guinea-pigs both subcutaneously and intraperitoneally, and to note and tabulate the results. The conclusions drawn are: (1) The substances injected intraperitoneally into mice and guinea-pigs arranged in order of their decreasing toxicity are eucalyptol and brilliant green; mercurophen; mercuric chlorid and chloramin-T; dichloramin-T and proflavine; hypochlorite, Dakin's hypochlorite, Javelle water, and magnesium hypochlorite; iodin and phenol. (2) Now that Dakin's bland solvent, chlorcosane, is available as a vehicle for dichloramin-T, eucalyptol should probably be discarded for this purpose, because of its much greater toxicity. (3) Inasmuch as experienced surgeons do not approve of the injection of solutions of iodin and phenol into closed cavities, it would seem advisable not to use any of the antiseptics here discussed in this manner, inasmuch as all exhibit a greater toxicity for mice and guinea-pigs than the two chemicals first named. (4) The method of testing toxicity of antiseptics by subcutaneous injection is not satisfactory, because exudation and subsequent sloughing reduce the rate of absorption, and make uncertain the amount finally absorbed.

THE DENTAL COSMOS

A MONTHLY RECORD OF DENTAL SCIENCE.

Devoted to the Interests of the Profession.

EDWARD C. KIRK, D.D.S., Sc.D., LL.D., *Editor.*
L. PIERCE ANTHONY, D.D.S., *Associate Editor.*

PUBLISHED BY THE S. S. WHITE DENTAL MFG. CO., PHILADELPHIA, PA.

SUBSCRIPTION PRICE, including postage, $1.00 a year to all parts of the United States, Hawaiian Islands, the Philippines, Guam, Porto Rico, Virgin Islands, Cuba, and Mexico. Canada, $1.40. To other foreign countries, $1.75 a year.

Original contributions, society reports, and other correspondence intended for publication should be addressed to the EDITOR, Lock Box 1615, Philadelphia, Pa.

Subscriptions and communications relating to advertisements should be addressed to the BUSINESS MANAGER of the DENTAL COSMOS, Lock Box 1615, Philadelphia, Pa.

PHILADELPHIA, AUGUST 1918.

EDITORIAL DEPARTMENT

The *Status Praesens.*

WE publish in this issue at page 733 the text of the Act of Congress reorganizing the Navy Dental Corps, reconstituting its grades with their respective pay and allowances, and establishing its status with respect to the Medical Corps of the Navy. With slight amendment the present law is the enactment of the bill which was introduced in the Senate by Senator Tillman and in the House by Representative Dyer. Its outstanding feature is its official recognition of the principle of equality of status within the respective grades of dental and medical service, the same principle which characterized the Act of Congress of October 6, 1917, with respect to army dental service. The dental profession is again to be congratulated upon the achievement of this epoch-making step in the history of its progress—epoch-making in the

sense that our national Government has set the seal of its official approval on the principle that dentistry is within its sphere entitled to the same recognition that it accords to all other departments of the science and art of healing. As we noted in our issue for April of this year in connection with the enactment of the present navy dental law, the Government recognition thus finally attained, is the outcome of upward of sixty years of more or less continuous effort upon the part of the dental profession to secure a proper understanding and adequate recognition of its inherent right to a place commensurate with its importance among the specialties of the healing art. The principle involved might have been established earlier had this legislative effort not had its course beset from time to time with the ambitious interference of those who held their personal interests as paramount to the professional welfare. More is yet to be accomplished before the status of the dental surgeon, both in the army and the navy, and the full efficiency of their service to the defensive forces of the nation, can be practically realized.

The present law, while it equalizes the status of dental surgeons and surgeons within a defined classification, limits the grades assigned to the dental surgeon and retains dentistry as a department under medical control. The future legislative program should aim at establishing additional grades in the dental corps to equalize it with the medical and other staff corps, and especially at the increase in the ratio of dental officers to such an extent that dental treatment will be universal and complete for the *personnel* of the Navy and Marine Corps; and ultimate separation of the dental corps in both army and navy from direct jurisdiction by the medical corps. These are objectives to be achieved in the future as growth and maturity in dentistry and in its service to the military arm justify their attainment. Recognition is sure to follow as the justification of service honestly and adequately rendered; what we have already gained is evidence of the truth of that assertion.

The exigencies created by the present war conditions have created the golden opportunity for dentistry to demonstrate the value of its service, and to its everlasting credit be it said, dentistry is responding promptly, loyally, and efficiently. Despite the wholly inadequate allotment of dental surgeons to the army and

navy *personnel* and the corresponding limitations to a complete dental treatment of those called to the nation's defense, the Army and Navy Dental Surgeons corps have rendered a splendid service and one of inestimable value and importance not only in relieving the many disabilities arising from defective teeth and mouth conditions; but what is more important though not by any means so obvious, the Dental Surgeons Corps has done its full share in maintaining the high standard of physical welfare of our troops, by eliminating, in so far as it has been physically possible to do so, infected mouth conditions which are the source of a long list of bodily ills.

The insufficiency of the present ratio of dental surgeons allotted to the army and navy *personnel* is self-evident. Recommendation by the dental committee of the Council of National Defense for a larger ratio of dental surgeons was made soon after the United States entered the war, and that the need for a larger corps is a real one in order that complete dental care may be available for the whole army and navy is evidenced by the emphasis placed upon the need of a larger dental corps by Representative Dyer in his argument in favor of the bill recently passed reorganizing the Navy Dental Corps. The most striking and practical evidence of the need for more thorough dental treatment for the army and navy *personnel,* and incidentally an equally striking example of the loyalty and enthusiastic support which the dental profession has been and is contributing to the winning of the war, is the magnificent and unselfish work being carried on by the Preparedness League of American Dentists. Through the intuition, personal enthusiasm, and devotion of Dr. J. W. Beach of Buffalo, the great possibilities of the service which civilian dentists could render in the preparation of recruits for military duty were clearly foreseen, and an organization with that object in view was started, at first in a modest way, in the early days of the war. A general appeal for volunteers followed, and so enthusiastic was the response that the largest organization in the history of American dentistry sprang into existence in a few brief months. Today the more or less incomplete returns show a record of upward of a half million dental operations performed by members of the League gratuitously for recruits entering the service. And the work is still going on in an increasing ratio.

Dentistry has in times past been subjected to criticism, justly or unjustly as the case may be, for its lack of willingness to render a public professional service without adequate compensation. Whatever may have been the case in the past, the practical evidence of the patriotic altruism of dentistry in the present world conflict is an indisputable refutation of that type of criticism now and for the future. The spirit in which the service is rendered is equally beyond criticism, for it is given not in the hope of reward in any material sense, but as the recognition of an opportunity to demonstrate the importance and value of our ministrations in conserving the health of those engaged in the national defense, and equally its importance to the health of the nation itself.

The events of our era are making history at a rapid rate. At no time in the past has dentistry developed so rapidly or been accorded in such large degree distinct recognition as one of the essentials of public health. Opportunity has knocked at her door and found her waiting; and, facing the future with a reasonable conservatism but with an abiding faith in the possibilities of her humanitarian service, dentistry is confidently approaching the fulfilment of the prophecy of Mayo by preparing to "take the next great step in preventive medicine"—toward the consummation of which all of her energies are now directed.

PERISCOPE

Spacing Between Natural and Artificial Teeth.—When spaces between teeth are desirable, let the spaces be between the artificial teeth rather than between artificial and natural ones. A group of porcelain teeth set closely together and separated by a space from an adjoining natural one would be apt to exaggerate and draw attention to those small differences in appearance between natural tissues and substitutes, differences which are more or less unavoidable. And it is better to have contiguous natural and artificial teeth arranged in correct approximal contact for two additional reasons, one being directly functional in protecting the gum and preventing the impacting of food, and the other being indirectly functional, inasmuch as the steadiness and retention of a denture is considerably increased by exact approximal contact between natural teeth and substitutes, which contact should be carefully preserved when adjusting and fitting the finished case in the mouth.—D. MACKINTOSH SHAW, *Dental Record.*

Setting Crowns and Bridges.—Evans' gutta-percha is one of the most valuable materials that we have in our office, and I have found that comparatively few dentists have ever used it. With it it is possible to set crowns and bridges as firmly as with cement, and yet they can be removed with ease.—O. D. DAVIS, *Dental Review.*

A Good Separating Medium for Plaster Impressions.—Having tried many of these, I have found none so quick and satisfactory as a solution of paraffin wax in petrol. It is clean to handle, always ready, and the impression can be painted over and cast within a few minutes after being taken.—H. J. MORRIS, *Ash's Journal.*

To Sterilize Dentin.—Before inserting a filling or cement base in a tooth in which the pulp is alive, evaporate a 15 per cent. solution of thymol in alcohol in the cavity. The thymol will penetrate the tubuli and sterilize the dentin. This will avoid irritation of the pulp, which may cause secondary dentin, pulp nodules, or even death to the pulp.—A. DE VRIES, *Dental Review.*

To Refit a Rubber Plate Without Vulcanizing.—Smear the plate with plaster, place in the mouth, and when hard remove. Pour a model. Remove the plate and also its plaster covering. Having had the shot of a Parker shot-swager in boiling water, or preferably glycerin, place the plate upon the model and embed in the swager. Do not hammer, but place a heavy weight upon the piston. Remove when cold.—L. E. CUSTER, *Dental Summary.*

Sensitive Dentin.—I never expose freshly cut dentin to the fluids of the mouth when I can help it, and whether I do or do not, I treat it to a touch of oil of cloves. Treating the cavity with alcohol followed by oil of cloves warmed with a puff of hot air from your chip-blower, and the cavity stopped with gutta-percha until the patient returns, will prevent the sensitiveness sometimes complained of after setting an inlay. Not only that, but pulps are not so likely to die.—HOMER ALMON, *Dental Review.*

Root-end Encapsulation.—When we come to the question of root encapsulation, there is where Dr. Rhein and I part company, because I do not believe in it. I do not believe in it because it is inconceivable to me, in the first place, that in any considerable percentage of cases a complete encapsulation of the denuded root-end with gutta-percha is possible, and secondly, I do not believe that the gutta-percha is any improvement over the root-end so far as healing is concerned.—ARTHUR D. BLACK, *Dental Review.*

To Prevent Broaches from Falling into the Throat.—If one is using a root-canal reamer in the fingers and working in the canals of a tooth upon which it is difficult (or impossible) to place the rubber dam and holder, use a sheet of Japanese bibulous paper folded between the teeth and tongue and allowed to extend toward the throat, and it answers the purpose of a rubber dam nicely; when wet, use another.—M. J. LINDERHOLM, *Farmington, Iowa.*

Spatulation of Silicate Cement.—Spatulation beyond the point of thorough and homogeneous incorporation of the powder and liquid is not necessary, though contrary instructions have been sent out with one of the silicate cements. It is desirable to put a larger portion of powder into the liquid at first, rather than to begin with small portions and increase. The first portion of powder put into the liquid should be as much as can be immediately and quickly incorporated with it, and successive portions smaller.—EDMUND NOYES, *Dental Review.*

To Avoid Air-bubbles in Plaster Casts.—After coating the impression with separating medium apply a moderately thin mix of plaster to the entire surface of the impression with a ½-inch oval paint-brush (not camel's hair). When coated, immediately immerse the brush in a glass of water, and finish pouring the cast in the usual manner. This avoids jarring the impression with probably fracture or distortion. Allow the brush to remain in water. When necessary to use it again the plaster will shake or jar out readily, and the brush is as clean as when new.—LESTER N. ROUBERT, *Dental Review.*

Finishing Dentures.—Many mechanics still spend much time and labor with files and scrapers over this work. It can, however, be greatly reduced. To begin with, the use of a piece of thin soft metal burnished over the wax will give a good surface in the most inaccessible part of the palate. Instead of filing the edges of the newly vulcanized plate, they are heated in the gas, and with a sharp knife can be pared down as rapidly as if they were cheese, and that without the slightest fear of warping them, because the heat is localized, vulcanite being a very bad conductor. The edges and surfaces can be

rapidly finished with a fine sandpaper arbor in the lathe, and with a little more trimming around the teeth the piece is ready for the final polishing. Large rosehead burs with the upper half of the sphere ground off are most useful in the workroom engine for trimming difficult places, and for doing quick and neat repairs. A small thin stone with a blunt edge is also a great help for finishing the embrasures between molars on the palatal aspect.—H. J. MORRIS, *Ash's Journal.*

Bismuth Salicylate for Root-filling.—Instead of chloro-percha I have used for twenty years for root-filling a paste made of bismuth salicylate and oil of cajuput. The oil is a solvent for gutta-percha. The bismuth comes as nearly being a permanent antiseptic as anything you can use. Be sure to get the salicylate instead of the subsalicylate, the latter being so light that it will not mix to a smooth creamy paste. Mix on a slab for each case.—F. C. NOYES, *Dental Review.*

Variation in the Size of Teeth in the Same Jaw.—It has been my experience that the teeth of one jaw do not harmonize with those of the other in size except in rare cases. I want to go farther, and say that the lateral halves of the arches do not correspond in the measurement of the teeth. There is the greatest latitude there. I had one case where one central incisor was three millimeters wider than its mate. I can show you bicuspids from one to one and one-half millimeters wider than the corresponding bicuspids on the other side. It is rather rare to find cases where the lateral halves of the arch correspond in measurement. It is the great latitude which we have in the amount of overbite that permits us to get anything like normal occlusion.—RAY ROBINSON, *Dental Items of Interest.*

"Hard" and "Soft" Teeth.—A careful observation of the phenomenon presented by the difference in the behavior of teeth under cutting instruments will reveal the fact that this difference is confined for the most part to the enamel, and that it does not relate to any variation in the chemical constituents of the teeth, but to the mere mechanical fact of the difference in the arrangement of the enamel rods. As everyone in the profession knows, the enamel rods stand with one end resting on the dentin, and from this radiating out toward the external surface of the crown of the tooth. It is the particular manner of this radiation that controls the resistance or lack of resistance of the enamel to cutting instruments. In some instances the rods radiate in a straight, regular, and almost parallel manner, while in others they pursue a wavy irregular course; this difference in the arrangement of the rods making the difference between enamel which cleaves easily and that which resists the instrument. It is well illustrated by the homely example of the difference between splitting straight-grained maple and bird's-eye maple. Every boy brought up in the country knows what a joy it is to split straight maple as compared with the difficulty attached to the attempt to split bird's-eye.—C. N. JOHNSON, *Dental Review.*

Precautions in the Use of Silicate Cement.—While the silicate is in the plastic state it is not hydraulic. This is due to the fact that the formation of the insoluble hydrated phosphates from the soluble acid phosphates requires some time for its completion. Hence, in order to avoid the solvent action of moisture at this stage some precautions should be observed.

(1) The tooth should be isolated by the rubber dam.

(2) The cavity should be dry. These simple methods will prevent any solution of the soluble salts before they have had the time necessary to convert them into insoluble ones.

(3) Inasmuch as the silicate undergoes a secondary hardening accompanied by a marked change in physical properties, in order to obtain the best possible results the filling should be coated with a varnish or other waterproof coating, which will prevent moisture from interfering with its proper crystallization.

One would not use a garden hose on a cement walk until at least twenty-four hours after it had been placed, so why should we permit water to come in contact with a silicate filling, the secondary hardening of which is analogous to that of Portland cement, until that filling has been allowed the same length of time for the final step in its hardening.—C. C. VOGT, *Dental Review.*

Preparation of the Tooth at the Gum Margin for a Porcelain Jacket Crown.—The enamel rod direction at the gingival border under the free margins of the gums compels us to remove the enamel entirely, if we are to have a perfect shoulder. Were we replacing it properly or not was a question. You can easily see that the thickness we remove and the amount we replace would have a bearing upon the tension given the soft tissues. I took a set of teeth and cut the

crown off 1 mm. from the gingival line, measured each surface, and cut off ½ mm. more. I found that the enamel varied in thickness upon each surface, and this variation was constant. It is impossible to reproduce this variation in thickness in a single banded crown, even if the different thickness of enamel on each surface was known.

The shoulder is cut with a plain fissure bur, starting at the labio-gingival angle and cutting across the labial. Then start at the center of the lingual, cut to the mesial, and through the approximal, joining the labial shoulder. Start again on the lingual, cut to the distal through the approximal, and join the labial again. The finished shoulder should be about ½ mm. wide, well under the free margin of the gum. A further refinement of the shoulder is made with a special set of instruments, cutting it so that it will incline inward and upward slightly toward the apex. This is an important detail.—George A. Thompson, *Dental Review.*

The Advantages of Nerve-blocking Anesthesia.—The advantages of nerve-blocking anesthesia for oral and dental surgery operations are many, but the following are probably the most important:

(1) The duration of the anesthesia may be changed according to the various amounts of the vaso-constricting agent. The long duration of anesthesia is of great value to the operator for the removal of impacted third molars, draining the antrum, root amputation, removal of tumors, removal of cysts, resection of the jaw, curetment of necrosed bone, plastic operations, removal of tonsils, and many other operations which come under the observation of the oral surgeon.

(2) Long duration of anesthesia permits the operator to take his time with the operation, which gives him the opportunity to employ all his skill when operating.

(3) Large or small areas may be anesthetized, depending upon the nerve or nerve branches blocked.

(4) Anesthesia is secured in infected or inflamed areas by blocking the nerve branch in healthy tissue at a distant point from the operative field.

(5) Nerve-blocking injections, when skilfully made, are without pain, because the needle is inserted into the mucous membrane and loose connective tissue.

(6) One or two insertions of the needle will block an operative field, depending upon the nature of the operation and the area to be blocked.—Arthur E. Smith, *Dental Review.*

The Teeth as Foci of Infection.—The ruthless extraction of teeth, as demanded by some of the physicians, is a crime against the patient, an indictment against the physician and the surgeon, and a sad commentary on the co-operation and understanding existing between the medical and dental professions. The mechanics of dentistry, the locating and cure of oral focal infection is outside of the physician's field, but it has taken the physician to point out to us that our modern dentistry, so perfect in a sense in its mechanics, is a menace to our patients' health and lives, and we must recognize the fact that our work has a very much farther influence on our patients' systemic condition for good or ill than we have dreamed. But let us not be stampeded into the belief that our treatments of teeth are the cause of all the troubles in the world. I think possibly our failures are not nearly as many or as grievous as the X-ray paints them. We have found that we get apical infections from the blood stream. Some surgeons demand that all infections be removed before they operate. Treating a tooth is a surgical operation. How would it be if we demanded that all focal infection be cleaned up before we devitalized? How do we know that many of these apical abscesses are not secondary in place of primary? Is it not reasonable that they are? How can you expect to get perfect results from treatments when the blood is filled with streptococci from tonsils, sinuses, gastric ulcers, etc.? So in place of being the arch sinner, maybe the teeth are the most sinned against organs in the body.—Charles A. Peak, *Dental Summary.*

Technique of Root-end Encapsulation.—Base-plate gutta-percha has been found the most suitable material for root-filling, and especially for encapsulating the end of the root, because of its compatibility with the human tissues and its unchangeable nature as far as contraction or expansion is concerned.

Having reached the point in the operation where the root-canal in a thoroughly aseptic state has been dried out and ready for filling, chloro-percha made by dissolving base-plate gutta-percha in chloroform is introduced in very fluid form into the canal, which is not only filled with it, but the material is pumped through the foramen. A point of gutta-percha, the diameter of which is the same all the way through, is now carried to the end of the canal, and there macerated by packing it with fresh chloroform. In this softened cheesy condition, it is now by compression forced through the foramen, and this

soft cheesy mass is immediately thrown back around the side of the root. The chloroform volatilizes with such rapidity that the root surface under it is dehydrated, and as a result the softened gutta-percha remains firmly adherent to this surface, whether or not covered with pericementum. Such is the ideal physical condition that takes place. This method is found more successful than the one formerly used of endeavoring to force the hard gutta-percha cone through the foramen. In this hardened state the cone has a tendency to protrude like a cork through a bottle, on account of its rigidity. Such a result will bring thorough success when there is only a simple foramen, but where we have multiple foramina it generally spells failure of the operation.—M. L. RHEIN, *Dental Review.*

Arch Form.—For a given set of teeth there exists not only one arch form which complies with our known rules of occlusion, but an indefinite number of them. If only one form existed, it would be a matter of mere chance for any one man to predetermine it.

That means we should endeavor to reconstruct that arch form which most likely will conform to given conditions. This predetermined arch form is subject to changes because we are limited to a great extent in making accurate measurements. If we were able to introduce absolutely correct measurements (which we cannot do) and had absolute and full knowledge of all requirements that make occlusion and mastication perfect (which is not the case), then we would be able to reconstruct an arch form best suited for a given set of teeth in the mouth. That such an arch form is the one nature intended, can hardly, however, be claimed.—RUDOLPH L. HANAU, *Dental Items of Interest.*

Care of the Toothbrush.—Many articles have been published in the dental journals on the septic state of the toothbrush as ordinarily cleaned before and after use, and advising how to treat it to produce a nearly sterile condition. Manufacturers of dental pastes and mouthwashes have showered the profession with circulars, claiming efficiency for their products to make the brush sterile, and proving it to their satisfaction by comparative tables of bacterial counts from cultures made from brushes, before and after the brushes have been in contact with their own mouthwash or paste. It is not in my recollection that boiling water has been recommended for that purpose. It may have been, but I have never found it in the journals. This may be owing, perhaps, to a supposition that boiling water injures and destroys the brush, which in my experience has not proved to be the case. Have a kettle of water on the gas or other heater; before brushing the teeth, pour generously of the water, when boiling, over the brush; after brushing the teeth pour boiling water again over the brush before putting it away, preferably in some closed container. After cleaning the teeth with floss and brush, rinse the mouth with tepid or warm water, which will remove the loose foreign particles better than cold water, which has a tendency to make them adhere.

This treatment of the brush with boiling water seems not to injure it. I have subjected my present brush to it for at least six months without damaging it in the least. I have made no laboratory experiments to determine the comparative efficiency of the method; it seems to me, however, that a germ that has had boiling water poured over it would be a pretty sick germ, disinclined for immediate mischief.

This method of course is practicable only where access is had to boiling water.—VINCENT FISCHER, *Dental Review.*

Apothesine.—A reliable local anesthetic has become one of the essentials in present-day operative dentistry. The disuse of novocain has forced itself on to the dental profession by reason of prohibitive cost and scarcity in this country.

About six months ago I began the use of apothesine, an American-made product, and it has apparently fulfilled all the requirements of an anesthetic. I have used it for more than five hundred cases of extraction; of this entire number ten applications were followed by more or less sloughing, but only two of these required any subsequent attention. The ten cases to which I refer included abscesses, ulceration, pyorrhea, and highly congested or flabby tissues. They were all observed in unclean and neglected mouths. No sloughing or irritation was observed in cases presenting anything like a normal condition of the gums.

In referring to the general use of a local anesthetic, based upon wide experience, it is my opinion that the undesirable and annoying conditions that sometimes follow infiltration anesthesia are due to faulty technique, or exceptionally unfavorable condition of the tissue. It is not reasonable to expect a prompt infiltration of any fluid in deeply congested gums. When injecting an anesthetic solution into such tissue the quantity should be as small as possible to produce the desired anes-

thetic effect, and may require a wider distribution of injections than in reasonably normal and healthy structures. It will also require a longer time for complete anesthesia to be effected. Where too much fluid is injected into a highly congested tissue, some destruction of the parts may be anticipated following extraction, especially if there is much trauma from the operation. This will vary according to the technique employed and the conditions with which the operator is working. Very embarrassing conditions may be produced by any aqueous solution, or even sterile water, although some operators may be tempted to lay the blame to the anesthetic agent. This is unfair both to the operator and to the agent employed.—PAUL J. GLUGLA, *Michigan Dental Journal.*

OBITUARY

Dr. Thomas Cook Stellwagen.

[SEE FRONTISPIECE.]

DIED, Friday, June 7, 1918, at the home of his daughter, Media, Pa., from diabetes, in his seventy-seventh year, THOMAS COOK STELLWAGEN, D.D.S.

Dr. Stellwagen was born in Philadelphia, Pa., July 24, 1841, the son of U.S.N. Capt. H. S. Stellwagen and Mary (Cook) Stellwagen. Dr. Stellwagen obtained his early education in the public schools of Philadelphia, and was graduated from the Philadelphia Central High School in 1859, receiving the A.B. degree. He received the M.A. degree in 1864.

At the age of eighteen years Dr. Stellwagen became interested in dentistry, and in 1859 began its study under the preceptorship of Dr. N. L. Dickey of New Orleans, La. Later he entered the Pennsylvania College of Dental Surgery, and was graduated from that institution with the D.D.S. degree in 1861. In 1866 he also received the D.D.S. degree from the Philadelphia Dental College, and continuing his professional education, he received the M.D. degree from the University of Pennsylvania in 1868. Upon the completion of his professional education, Dr. Stellwagen began the practice of dentistry in Philadelphia, and continued in active practice until 1912, when he retired.

At the outbreak of the civil war, Dr. Stellwagen enlisted in the United States navy, and acted in the capacity of paymaster upon the U.S.S. "Mercedita," which was commanded by his father, Henry S. Stellwagen, during the civil war. The vessel on which Dr. Stellwagen served was in several engagements during the civil war, and did blockade duty until 1863. He was later transferred to the U.S.S. "Constellation," on which ship he served until the close of the war.

In 1865 he resigned from the United States navy and resumed his practice in Philadelphia, accepting the demonstratorship of operative dentistry in the Philadelphia Dental College, from which institution he received the *ad eundem* degree in 1866. In 1869 he was elected to the chair of dental histology and operative dentistry in the above institution. In 1879, upon the death of his lifelong friend, Prof. John H. McQuillen, the founder of the college, Dr. Stellwagen was made professor of physiology, which professorship he held for many years.

At the beginning of his professional career, Dr. Stellwagen took a lively interest in dental societies, and was one of the organizers of the Odontographic Society of Pennsylvania and the Pennsylvania State Dental Society, being elected corresponding secretary of the State Society at its meeting of organization. He later in 1899 served the State Society as president. He was a member of the American Academy of Dental Science, the Pennsylvania Association of Dental Surgeons, a corresponding member of the Odontological Society of Great Britain, a member of the Academy of Natural Science of Philadelphia, and of the Franklin Institute.

Dr. Stellwagen was a conspicuous member

of the group of dentists in America which followed very closely the pioneers of dentistry in this country, and did much to maintain the high professional standing of dentistry at the time when Philadelphia established its name as the "home of dentistry." He was always dignified and courteous in his manner, and was ever held in the highest esteem by his professional associates and by all who were privileged to know him professionally and socially.

Dr. Stellwagen made many contributions to the literature of dentistry, notably among which was his revision and editing of "Coleman's Manual of Dental Surgery and Pathology" for the American profession in 1882.

Dr. Stellwagen was married, in Philadelphia, March 5, 1868, to Miss Annie Eliza Carpenter. He is survived by his son, Major Thomas C. Stellwagen, Jr., and five daughters.

THE following *in memoriam* resolutions on the death of Dr. Stellwagen were adopted by the Academy of Stomatology of Philadelphia:

Whereas, death has removed from us our esteemed friend and fellow member, Thomas C. Stellwagen; therefore be it

RESOLVED, That the Academy of Stomatology, of which he was an honored member, recognizing his long and useful career and his great worth as a teacher and contributor to dental literature, desires to express its sorrow for his loss, and to extend to his family this expression of sincere sympathy in their great bereavement; and be it also

RESOLVED, That these resolutions be placed upon the minutes, a copy sent to the bereaved family, and that they be published in the DENTAL COSMOS.

ROBERT HUEY,
M. H. CRYER,
W. STIRLING HEWITT,
Committee.

Dr. Henry B. Nones.

DIED, Wednesday, May 1, 1918, at his home in Philadelphia, Pa., in his forty-eighth year, after an illness of several months, HENRY BENJAMIN NONES, D.D.S.

Dr. Nones was born in Philadelphia on December 6, 1870, the son of the late Dr. Samuel Smith Nones and Harriet (Hodgson) Nones. Dr. Nones received his early education in the public schools of Philadelphia, and later entered the Philadelphia Dental College, from which institution he was graduated in 1891.

Dr. Nones came from a family three generations of which have been dentists. He was for several years chief demonstrator of mechanical dentistry in the dental department of the Medico-Chirurgical College of Philadelphia, of which institution his brother, Dr. Robert H. Nones, was dean at the time, and with whom he was associated in practice for about twenty-five years.

Dr. Nones married Miss E. Florence Slater, who with his brother, Dr. Robert H. Nones, his sister, Miss Ida Wiley, and a half-brother, Albert Nones, survives him.

Dr. Louis A. O'Brian.

DIED, Tuesday, June 4, 1918, at his home, Harmon-on-the-Hudson, in his fifty-fifth year, from septic poisoning, LOUIS A. O'BRIAN, D.D.S.

Dr. O'Brian was born in Providence, R. I., in 1863. He obtained his early education in the public schools of Providence, later being graduated from the Brown University. In 1886 he entered the Philadelphia Dental College, from which institution he was graduated in 1888. Soon after his graduation Dr. O'Brian went to Paris to practice his profession, later removing to Dresden, Germany, where he conducted his practice until 1903, numbering among his *clientèle* in Dresden the Crown Prince Louis of Saxony and many others of the royal family. Dr. O'Brian returned to the United States in 1903, and established himself in New York City, where he continued to practice until the time of his death.

Dr. O'Brian was a member of the National Dental Association, the First District Dental Society of the State of New York, a member and at one time president of the American Dental Society of Europe, a member of the faculty of the Flower Hospital Medical College of New York, and attending dentist to the New York Surgical, Throat, Nose, and Lung Hospital.

Dr. O'Brian is survived by his widow and two sons.

DENTAL LEGISLATION
AND
LEGAL DECISIONS.

Naval Appropriation Bill—Provision for the Naval Dental Corps.

[AMENDMENT NO. 23, AS AMENDED.]

THE provision for the Naval Dental Corps (Amendment No. 23), was amended to read as follows:

That the Act approved August 29, 1916, entitled "An Act making appropriation for the Naval Service for the fiscal year ending June 30, 1917, and for other purposes" (Statutes at Large, vol. 39, chapter 417, pp. 573, 574), be, and the same is hereby, amended by striking out all of said Act following the caption "Naval Dental Corps," on page 573, but preceding the caption "Dental Reserve Corps" on page 574, and by substituting therefor the following:

That the President of the United States is hereby authorized to appoint and commission, by and with advice and consent of the Senate, dental officers in the Navy at the rate of one for each thousand of the total authorized number of officers and enlisted men of the Navy and Marine Corps, in the grades of assistant dental surgeon, passed assistant dental surgeon, and dental surgeon, who shall constitute the Naval Dental Corps, and shall be a part of the Medical Department of the Navy. Original appointments to the Naval Dental Corps shall be made in the grade of assistant dental surgeon with the rank of lieutenant (junior grade) and all dental officers now in the dental corps appointed under the provisions of the Act of Congress approved August 22, 1912 (Stat. at L., ch. 37, p. 345), or under the provisions of the Act of Congress approved August 29, 1916 (Stat. at L., ch. 39, p. 573), or may hereafter be appointed, shall take rank and precedence with officers of the Naval Medical Corps of the same rank according to the dates of their respective commissions or original appointments, and all such dental officers shall be eligible for advancement in grade and rank in the same manner and under the same conditions as officers of the Naval Medical Corps with or next after whom they take precedence, and shall receive the same pay and allowances as officers of corresponding rank and length of service in the Naval Medical Corps up to and including the rank of lieutenant-commander: *Provided*, That dental surgeons shall be eligible for advancement in pay and allowances, but not in rank, to and including the pay and allowances of commander and captain, subject to such examinations as the Secretary of the Navy may prescribe, except that the number of dental surgeons with the pay and allowances of captain shall not exceed 4½ per cent. and the number of dental surgeons with the pay and allowances of commander shall not exceed 8 per cent. of the total authorized number of dental officers: *Provided further*, That dental surgeons shall be eligible for advancement to the pay and allowances of commander and captain when their total active service as dental officers in the Navy is such that if rendered as officers of the Naval Medical Corps it would place them in the list of medical officers with the pay and allowances of commander or captain, as the case may be: *And provided further*, That dental officers who shall have gained or lost numbers on the Navy list shall be considered to have gained or lost service accordingly; and the time served by dental officers on active duty as acting assistant dental surgeons and as-

sistant dental surgeons under provisions of law existing prior to the passage of this Act shall be reckoned in computing the increased service pay and service for precedence and promotion of dental officers herein authorized or heretofore appointed.

All appointees authorized by this Act shall be citizens of the United States between twenty-one and thirty-two years of age, and shall be graduates of standard medical or dental colleges and trained in the several branches of dentistry, and shall, before appointment, have successfully passed mental, moral, physical, and professional examinations before medical and professional examining boards appointed by the Secretary of the Navy, and have been recommended for appointment by such boards: *Provided*, That hereafter no person shall be appointed as assistant dental surgeon in the Navy who is not a graduate of a standard medical or dental college.

Officers of the Naval Dental Corps shall become eligible for retirement in the same manner and under the same conditions as now prescribed by law for officers of the Naval Medical Corps, except that section 1445 of the Revised Statutes of the United States shall not be applicable to dental officers, and they shall not be entitled to rank above lieutenant-commander on the retired list, or to retired pay above that of captain.

All dental officers now serving under probationary appointments shall become immediately eligible for permanent appointment under the provisions of this Act, subject to the examinations prescribed by the Secretary of the Navy for original appointment as dental officers, and may be appointed assistant dental surgeon with the rank of lieutenant (junior grade) to rank from the date of their probationary appointments: *Provided*, That the senior dental officer now at the United States Naval Academy shall not be displaced by the provisions of this Act, and he shall hereafter have the grade of dental surgeon, and the rank, pay, and allowances of lieutenant-commander, and he shall not be eligible for retirement before he has reached the age of seventy years, except for physical disability incurred in the line of duty: *Provided further*, That no dental officer in the Navy who on original appointment as dental officer was over forty years of age shall be eligible for retirement before he has reached the age of seventy years, except for physical disability incurred in the line of duty.

All acts or parts of acts inconsistent with the provisions of this Act relating to the Dental Corps of the Navy are hereby repealed: *Provided*, That nothing herein contained shall be construed to legislate out of the service any officer now in the Medical Department of the Navy, or to reduce the rank, pay, or allowances now authorized by law for any officer of the Navy.

Approved.

Decisions in Patent Litigation.

Cassius M. Carr Patent Void.

United States Court Decrees Patent on Pyorrhea Tools Invalid.

Dentists everywhere will be interested in learning that certain litigation of great importance to the profession has just terminated. The result is a complete victory for the Dental Protective Association of the United States, which, in carrying out the objects of its charter, successfully assumed the defense of a case brought against one of its members.

The Carr School of Preventive Dentistry and Medicine, assignee of Cassius M. Carr, brought suit against Dr. Austin F. James of Chicago, in the U. S. District Court for the Northern District of Illinois, Eastern Division, for alleged infringement of the Carr patent on pyorrhea tools and for unfair competition in trade. On Tuesday, July 2, 1918, His Honor Judge George A. Carpenter entered a final decree adjudging as invalid, void, and of no effect in law those letters patent known as No. 1,138,355, issued May 4, 1915, to Cassius M. Carr, on dental tools, and which the patentee purports to exemplify in a set of one hundred and fifty tools, well known as the "Carr pyorrhea set." The suit was

ordered dismissed for want of equity, at the plaintiff's costs.

The importance of the case arises from the establishment of the right of all dentists to avail themselves of instruments of the type described in the patent, in larger or smaller sets, without paying patent tribute to anyone. The Dental Protective Association of the United States conceived that the patent sued on was not a good patent in law, and that its existence could be made, and was likely to be made, the basis of serious oppression to dentists, especially in view of the numerous suits already brought under it. The suit against Dr. James was one which the association considered to be of that character. The Dental Protective Association has consistently fought to protect its members from unjust and unlawful patent claims, and makes no distinction in this respect between patents for mechanical devices and patents for processes or methods. While its chief obligation is to its members, such results as come from its success in the present case will inure to the benefit of the profession as a whole.

A vast amount of testimony was taken by both parties to the suit, the plaintiff having thirty-six witnesses and the defendant twenty-five. For the defendant a large number of the most prominent teachers and practitioners on the subject of pyorrhea gave valuable testimony.

The defeat of the Carr patent ought to relieve many dentists from the annoyance of litigation which Carr or the Carr School has threatened to institute. The air is cleared, and dentists now are justified in treating the patent as though it did not exist.

In passing it may be mentioned that a suit brought by Carr against Dr. Thomas B. Hartzell of Minneapolis, on the same patent, was defended by the Dental Protective Association, and was also dismissed at Carr's costs.

The association's attorneys are Mr. Percy B. Eckhart of Chicago, general counsel, and Mr. Luther Johns of Chicago, patent counsel. We express our appreciation of the very thorough preparation of the case and its successful defense.

[Signed] J. G. Reid,
D. M. Gallie,
J. P. Buckley,
Directors,
Dental Protective Association.

Dentists' Mutual Protective Alliance Wins in Taggart Case.

Decision in the Federal Court, Northern District of Illinois.

On March 4th, Judge F. A. Geiger, of the Federal Court for the Northern District of Illinois, filed a decision which closed the longest and hardest chapter in the history of the litigation involving the Taggart cast-inlay patents. The thirteen cases just decided by Judge Geiger will now go to the highest Court of Appeals, where the final chapter will be written.

The case has been in the courts nearly three years. On certain points it was at one time appealed to the Appellate Court, which in June 1916 sustained the Alliance and confirmed Judge Geiger, and referred the case back to him for trial. Final arguments were made in April 1917.

Judge Geiger's decision is voluminous, covering some thirty-two typewritten pages, and is regarded as a complete victory for the Alliance.

Dr. Taggart's infringement suits against the thirteen practicing dentists of Chicago were selected from five hundred and twenty-three (523) similar suits to be defended by the Dentists' Mutual Protective Alliance in order to secure a final and conclusive adjudication upon any and every question which could arise under any of the four Taggart patents. Every one of the questions raised by the attorneys for the Alliance or the attorneys for Dr. Taggart is now decided in favor of the defendants, who were sued for an injunction and for profits and damages.

The four Taggart patents cover every phase of the production of a cast inlay from the formation of the wax pattern to the setting of the casting. The patents contain forty-six claims covering all of the steps of the process, all of the apparatus, including rings, flask-covers, sprue-formers, etc., and the prod-

ucts resulting at the various stages of the process—such, for example, as the wax pattern itself, the mold, and the final casting.

Every dentist who makes or sets a cast inlay filling infringes a majority of the claims of the Taggart patents. There was no question that the defendants in these thirteen test cases infringed many claims of the several patents. The question to be determined was, therefore, whether these claims were valid.

Judge Geiger's decision is to the effect that these claims are not valid, because they do not cover processes or apparatus or products which were new and original with Dr. Taggart. They had all been developed, used, and given to the profession long before Dr. Taggart obtained his patents.

Dr. Taggart's attorneys have announced that these thirteen test cases will be taken to the Court of Appeals, which is the court of last resort in patent cases.

Dental College Commencements

Cincinnati College of Dental Surgery.

The commencement exercises of the Cincinnati College of Dental Surgery were held at the Business Men's Club, Cincinnati, Ohio, May 29, 1918.

An address was made by Dr. G. S. Junkerman, dean.

The degree of Doctor of Dental Surgery was conferred by E. W. Wilkinson, president of the board of trustees, upon the following graduates:

Carl E. Becker
Frank A. Coburn
Alfred Friedman
Clarence D. Hughes
James C. Johnson
William R. Knight
Albert S. deLatour
J. Kalman Leon
Jacob E. Levin
Charles T. Meiring
Leon Reisenfeld
Earl C. Smith
Elmer C. Threlkeld
David D. Tomb
George W. Watkins, Jr.

Ohio State University, College of Dentistry.

At the annual commencement exercises of the College of Dentistry of Ohio State University, held in Columbus, Ohio, May 28, 1918, the degree of Doctor of Dental Surgery was conferred on the following graduates:

Thomas F. Auld
Harold W. Babington
Walter D. Barcroft
Charles E. Beatty
Robert J. Bennett
Paul D. Black
Dean H. Booth
Wm. B. Braumiller
Herbert F. Brown
Edward P. Buddenhagen
Claude M. Campbell
Leo M. Carr
Joseph F. Carroll
Adonis G. Cashbaugh
Franz C. L. Claypool
Ralph B. Clugh
Clarence S. Delashmutt
Elijah D. Douglass
Harry H. Douglass
John W. Dunbar
James E. Dunn
Arthur M. Elam
Botner F. Elam
Hubert B. Eyman
Oscar J. Fillinger
Austin T. Fisher
Phillip A. Floyd
Ira L. Fulk
Harold W. Hart
Arthur A. Hartupee
Robert W. Heibertshausen
Nelson S. Hoover
Fred F. Jones
Morton H. Jones
Leroy H. Kauffman
Albert N. Kishler
Myron W. King
Robert A. Lush
Bruce A. Mayer
Robert P. Merrill
Davison B. Moore
Alva C. Myers
Ernest R. Myers
Joseph C. Nageleisen
Victor Park
Jean M. Putnam
Chester E. Rasor
Thomas W. Ream
Harry E. Sarchet
Earl M. Sheehan
Alice M. Smith
Jasper W. Tall
Richard M. Titus
Eurat D. Vosper
Homer C. Wagner
Everett L. Watkins
Chester E. Wetherill
Russell H. Wetzel
Leonard O. Wheeler
William D. Williams
Harold G. Wolfe

McGill University, Department of Dentistry.

At the annual convocation of the Department of Dentistry of McGill University, held in Montreal, Can., the degree of Doctor of Dental Surgery was conferred on the following graduates:

B. Gold ..... Montreal
C. N. P. Moore ..... Quebec
V. S. Primrose ..... Maryland
J. W. Rooney ..... Quebec
Myer Solomon ..... Montreal

Georgetown University, Dental Department.

At the annual commencement exercises of the Dental Department of Georgetown University, held in Washington, D. C., the degree of Doctor of Dental Surgery was conferred on the following graduates:

Charles Basseches
John E. Black
David D. Bowman
Harold M. Britton
Richard J. Curran
Andrew F. Gaffney
Harold V. Garrity
Stephen F. Hardy
Patrick Kelleher
Joseph J. Klauser
Charles Longcor
Joseph C. Munster
Francis M. Murray
Joseph Norman
Thomas W. Power
Albert A. Reilly
George L. Reilly
Joseph G. Reilly
Nevel K. Rodgers
Edwin W. Schultze
Charles L. Smith
Doran S. Thorn
Arthur L. Vickery
Benjamin Yarowsky

North Pacific College.

The annual commencement exercises of North Pacific College were held on Wednesday, May 29, 1918, in Portland, Ore.

Addresses were delivered by Herbert C. Miller, M.D., D.D.S., Dr. Joshua Stansfield, and Calvin S. White, M.D., Major M.R.C.

The degree of Doctor of Dental Medicine was conferred by the president of the college, on the following graduates:

Henry F. Adler
Korenori Anan
Cedric C. Anderson
Oswell A. Anderson
Thomas C. Bailey
William S. Balcom
Arthur F. Balkema
Alfred H. Bayne
Joseph Bell
Norman Bouchet
John C. Breckenridge
Clarence L. Brown
John D. Butler
Douglas A. Casselman
Kenneth B. Casselman
Roy E. Cate
James M. Chilson
Harold A. Christoffersen
Clifford O. Dennis
Raymond E. Dickinson
Fred J. Dingler
Thomas S. Dulin, Jr.
Anders Ejde
Frederick M. Elworthy
Otis N. Farley
Irvin V. Franckenberg
Abram G. Friedline
Oliver G. Garrett
Arthur F. Grabbert
Edward E. Gray
Fred E. Gulick
Ernest H. Hall
Ralph M. Hamstrom
James E. Harding
Fisher L. Hauer
James G. Hazlett
Julius H. Held
Claude E. Hicks
Robert E. Hill
Rowland W. Hill
Henry C. Houck
Laron D. Hyde
Albert F. Ihringer
Walter L. Iles
Clarence H. Irwin
Lewis J. Keliher
Alpha M. Koester
Charles A. Lamkin
Otto R. Leavell
William E. Lebow
John R. Lighty
Carl R. Lofgren
Forrest A. Lowe
John J. McCarthy
George S. McCord
David A. MacEachern
Joseph F. Maguire
Ralph W. Maris
Carl L. Marquardt
George W. Marshall
Lloyd M. Masemore
Wagner H. Mast
Leroy J. Maurer
Clarence B. Messamore
Carl E. Miller
James D. Neidich
William S. Newitt
Angus C. Nicholson
Paul McK. Noel
Urban P. O'Connor
John C. Page
Thomas W. Parker
Chauncey C. Peck
Bennie H. Pedersen
Guy M. Perham
Walter H. Pickering
Gerald L. Plant
Nate S. Reingold
William W. Robbins
Oscar W. Rogers
Eugene Rollefson
Arthur N. Russell
William A. Rutledge
Harvey A. Schneider
Norman H. Scott
Andy W. Sears
Harry Semler
Harry Sirginson
Frank E. Sprague
Lloyd R. Springer
William M. Stern
Charles L. Stolte
Frank D. Sullivan
Clayton D. Sumner
Yanosuke Takeda
Leonard F. Tepoorten
Laurence E. Thornton
Joseph M. Timlin
Clinton B. Titus
Leif Underdahl
Eber H. Utter
Arthur C. Wagner
James T. Walls, Jr.
Howard M. Wheeler
Jerome H. Whisler
J. Handley Williams

New York College of Dentistry.

THE fifty-second annual commencement exercises of the New York College of Dentistry were held in Carnegie Hall, New York, N. Y., on Monday, June 10, 1918.

An address to the graduates was delivered by Alexander W. Thornton, L.D.S., D.D.S., D.Sc.

The degree of Doctor of Dental Surgery was conferred by David Webster, M.D., vice-president of the board of trustees and directors, on the following graduates:

Thomas J. Agnew	New Jersey
Herman R. Ahlers	New York
Louis D. Amsterdam	New York
Wendell M. Arnold	New York
Nehemiah Aronson	New York
Julius Baldwin	New York
Maurice S. Barshad	New York
Morris B. Bernfeld	New York
Harry L. Bernstein	New York
John J. Bider	New Jersey
Samuel H. Bolotsky	New York
Bernard Bor	New York
Abraham Brand	New York
Henry Braunstein	New York
Benjamin Breger	New York
Milton M. Bronstein	New York
Isidor Brooks	New York
Milton Bruder	New York
John F. Burke, Jr.	New Jersey
Harry Cherry	New York
Henry Cohen	New York
Jacob Cohen	New York
Samuel Cohen	New York
William Cohen	New York
Philip R. Courten	New York
William S. Curran	New York
Harold S. Diamond	New York
Abraham M. Ditchik	New York
Charles Dolowitz	New York
Kingman N. Donally	New York
Samuel M. Dooreck	New York
Abraham Dorn	New York
Herman M. Dworkin	New York
Herbert J. Eichner	New York
Murray Elters	New Jersey
Moses A. Fink	New York
Walter A. Foley	New York
Leo Gellert	New York
Irving V. Gerard	New York
Hugh Gibb, Jr.	Connecticut
Isadore B. Ginsberg	New York
Benjamin Ginsburg	New York
Abraham Gliboff	New York
Morris Glick	New York
Jesse J. Gluck	New York
Jacob D. Gold	New York
Max Goldenberg	New York
Bernard Goldman	New York
Alfred J. Goldstein	New Jersey
Charles Goldstein	New York
Walter Goldstein	New York
Jesse Goodman	New York
David Goodstein	New York
Michael Gordin	New York
Herman Gordon	New Jersey
Victor A. Granelli	New Jersey
Joseph C. Green	New York
Samuel Greenberg	New York
Solomon Greenberg	New York
Benjamin S. Greenberger	New York
Abraham Greenky	New York
Albert C. Grimm	New Jersey
Benjamin Gross	New York
Charles Grossman	New York
Stephen F. Guntner	New York
Benjamin B. Haas	New York
Charles Haimowitz	New York
Arthur Harrison	New Jersey
Charles Hattauer	New York
Abraham J. Hertz	New York
Ellis Hoffman	New York
Everett L. Hoffmire	New Jersey
Howard C. Hoxsie	New York
Sidney S. Jedel	New Jersey
Edward A. Jurek	New York
Abraham S. Karper	New York
Louis P. Karshmer	New Jersey
Albert Kassner	New York
Sigmund Kaswiner	New York
Harry Katz	New York
Maxwell B. Kaufman	New York
Moses A. Kaufman	New York
Leon Kossin	New York
Benjamin Kringstein	New York
Jacob Lange	New York
Louis A. Leichter	New York
Morris R. Lemler	New York
Maxwell J. Lentz	New Jersey
Louis C. Le Roy, 3d	New York
Frank Levander	New York
George J. Levbarg	New York
Edward Levenson	New York
Boris Levitt	New York
Henry Levy	New York
Irwin R. Levy	New York
Nathan M. Libowsky	New York
Samuel Lichtenstein	New York
Benjamin Lieberman	New York
Hyman Lipshitz	New York
Samuel Livant	New York
Frank Locker	New York
Paul Mann	New York
Abraham Margulis	New York
Samuel R. Markoff	New York
Israel Maskin	New York
George D. Mendels	New York
Morris R. Millstein	New York
Joseph Mitchell	New York
Andrew T. G. Morey	New York
Frank V. Nemecek	New York

Frank Nicolai	New York
Frank H. O'Brien	New York
Harry Phillips	New York
Abram Polay	New York
Christian Rapp	New York
Julius Reibel	New Jersey
Samuel Reiner	New York
Harry Resnick	New York
Reuben Resnick	New York
Benjamin Roberts	New York
Jacob Rosenbluth	New York
Emanuel Rosenwasser	New York
Adolph Rosetstein	New York
Nathan Sandomirsky	New York
Leo J. Schaefer	New York
John M. Schapiro	New York
Solomon Schecter	New York
Joseph F. Scheina	New York
Francis R. Schlesinger	New York
Julius Schlossberg	New York
Abraham Schnader	New York
Alexander Schonbar	New York
Louis Schorr	New York
Abraham J. Schwartz	New York
Morris Schwartz	New York
Jerome M. Schweitzer	New York
Isidore L. Seifer	New York
Harry M. Seldin	New York
Samuel Shapiro	New York
Walter I. Shapiro	New York
Henry I. Shaw	New York
Jacques L. Sherman	New York
Julius Sherman	New York
Bernard A. Shield	Connecticut
Barnett Sholk	New York
Harry Shoobs	New York
Maurice Siegel	New York
Maurice L. Siegel	New York
Harry B. Silver	Connecticut
Morris H. Silver	New York
Samuel L. Silverstein	New York
Boris Skraly	New York
Moses Slutsky	New York
Carl Soderling	New York
Irving Sperber	New York
Franklin Squires	New York
Paul Stanislaw	New York
Harry S. Stein	New York
Isidor J. Stein	New Jersey
Max L. Stein	New York
Mayer Steinman	New York
Samuel Steinman	New York
Ralph L. Stiles	New Jersey
Harry Strusser	New York
Abraham M. Suchoff	New York
Alexander Sved	New York
Leo Tanzer	New York
Louis Tarson	New York
Alexander McK. Telfer	New York
Abraham I. Tobin	New York
Benjamin Troy	New York
Simon Ulick	New York
Benjamin Volk	New York
Samuel Waterman	New York
Harry Weiner	New York
Samuel N. Weinstein	New York
Henry K. Weinstock	New York
Maximillian Weiss	New York
Harold Welkowitz	New York
Frederick L. Whiting	New York
Edward Whynman	New York
Harry C. Wiener	New York
Simon Wilensky	New York
Jacob M. Wisan	New York
Jacob Zasuly	New York
Morris A. Zimmer	New Jersey
Edward Zuckerman	New York
Joseph Zuckerman	New York

Loyola University, School of Dentistry.

At the commencement exercises of the School of Dentistry of Loyola University, held in New Orleans, La., the degree of Doctor of Dental Surgery was conferred on the following graduates:

George L. Agin	Alfred B. Browne	J. Nicolas Martinez	Clemens V. Rault
Henry L. Bowman	John S. Faulk	Bernard J. Prejean	George H. White
Laurent T. Broussard	Mary J. Howard		

Royal College of Dental Surgeons.

At the regular 1918 commencement exercises of the Royal College of Dental Surgeons of Ontario, held in Toronto, the degree of Licentiate of Dental Surgery was conferred on the following graduates:

Francis H. Barry	Hugh K. Henderson	Alex. McCuaig	Theobald Regnier
Archibald W. Boyd	Elford V. Humphreys	Edmund S. McGowan	Bernard Schaffer
Abe S. Fauman	T. H. Hutchinson	E. C. McKee	Samuel W. Sproule
F. C. Harwood	G. H. Jones	Moore F. McRae	E. C. Young

College of Jersey City, Department of Dentistry.

At the annual commencement exercises of the Department of Dentistry of the College of Jersey City, the degree of Doctor of Dental Surgery was conferred on the following graduates:

Joseph Bleich
Meyer Millekofsky

Lincoln Dental College.

The annual commencement exercises of Lincoln Dental College were held in Lincoln, Nebr., on June 1, 1918.

An address was delivered by Rev. L. D. Young.

The degree of Doctor of Dental Surgery was conferred by the dean, Dr. Clyde Davis, on the following graduates:

Burnham B. Ames
Earl C. Andrew
John G. Aukes
Leonard S. Biddlecom
Frederick L. Blessing
August E. H. Blomenkamp
Lawrence D. Bromfield
Hubert A. Capek
Don T. Clark
Harry E. Colbert
Alfred E. Curley
Perry L. Evans
Clarence W. Granger
Donald S. Hinman
Harold A. Howard
Arvid Karlson
Frank H. Miller
Richard D. Minnick
Clyde A. Nelson
George D. Odiorne
Harold F. Parish
Harold G. Patterson
David J. Pope
Irving W. Pratt
Jerome M. Pucelik
William E. Smith
Elmer E. Swanbom
Fred G. Thomas
Hugh C. Thomas
Eldo G. Tucker
Frank A. Wilson
Ray E. Witham

Indiana Dental College.

The annual commencement exercises of Indiana Dental College were held on Tuesday, June 11, 1918, in Indianapolis, Ind.

An address was delivered by Prof. Oscar H. Williams.

The degree of Doctor of Dental Surgery was conferred by Dr. John N. Hurty, president of the board of trustees, on the following graduates:

Oral D. Adams
Lex C. Arnett
Charles E. Arnold
Merrill R. Baker
Harry S. Banks
Alvin E. Barkes
Forrest R. Bell
Frank M. Belt
Marvin T. Botkin
Frank W. Boyd
Runo G. Brodeen
Raul V. Brown
Harry E. Bruner
Rodolfo A. Campani
Lester M. Choate
Arthur E. Christerson
Clarence F. Coleman
Albert R. Collins
George M. Cropp
Matthew S. Cuff
Charles S. Davis
Fenton B. Davison
Ross L. Davison
Enoch H. Derrick
Carson W. Dietrich
E. Millard Dill
Harold C. Downing
Edgar F. Duvall
Arthur W. Edman
Willis B. Eggleston
John S. Eilar
John A. Elliott
Harry Epstein
Noble R. Fox
Edgar A. Frantz
Hugh J. Gallagher
Perry C. Garman
W. Orville Godwin
John B. Gordon
Cameron N. Griffith
Robert L. Guedel
Earl E. Hoffa
Frank L. Hubbard
Frank C. Hughes
Don F. Irvin
Von L. Kennedy
Karl P. Kretch
Neal M. Loomis
Earl L. McKee
Robert McKee
John E. Martin
Cullen B. Meckel
Elmer H. Miller
Carl F. Morganthaler
Leo R. Newberger
Ralph J. Overstreet
George L. Oyler
John P. Parr
Claude E. Pierce
Joseph E. Pulley
Alexander D. Pow, Jr.
Samuel J. Purviance
Lynn G. Reed
Fred W. Richards
S. Paul Richards
Wade D. Rogers
Stark O. Sanders
Harry A. Schiess
Harry M. Schneider
Russell F. Shafer
Alphonso P. Shipman
Thomas C. Smiley
Stewart B. Smith
James C. Stewart
Ellis Y. Tagawa
Howard Thomas
Jesse V. Towe
Ralph S. Turner
Clinton P. Walker
Louie E. Wampler
Barney J. Warczak
James C. Weatherholt
Emil L. Welsch
Lee E. Wherry
Douglas H. White

Washington University, Dental Department.

THE fifty-seventh commencement exercises of Washington University Dental Department were held on Thursday, June 13, 1918, in St. Louis, Mo.

An address was delivered by Edmund Janes James, Ph.D., LL.D., president of the University of Illinois.

The degree of Doctor of Dental Surgery was conferred by Chancellor Frederic Aldin Hall, LL.D., on the following graduates:

John M. Beard
Carl J. Beinker
Frank D. E. Benway
James L. Bowman
Francis J. Brandenburg
George H. Bredall
Harold H. Brummall
Walter L. Buck
Grover C. Clay
Charles H. Dean
Erwin C. Elsner
William H. Freshour
Bertram E. Gilster
Moses Glassman
James E. Harding
George H. Herbert
Walter H. Heseman
Thomas R. Hollinshead
Irvin J. Kehr
Wycliffe E. Kling
Robert F. Lentz
James D. Nelson
Harry Oksner
Roy C. Parkhill
Lyle D. Perry
Evan W. Petty
Lizzie R. Powell
Calvin A. Reibert
Elmer Reising
Alvin V. Sanders
Arthur J. Schaub
Lawrence A. Snavely
Larkin E. Stark
Edward L. Stroh
William Stroh
Robert J. Throgmorton
Seth C. Thomas
Thurlo T. Weir
Walter W. Wieman
Samuel F. Wilmesher
Jack V. Woodson

College of Dental and Oral Surgery of New York.

THE annual commencement exercises of the College of Dental and Oral Surgery of New York were held in Carnegie Hall, New York City, June 4, 1918.

The valedictorian was Clifford S. Wheeler, D.D.S., and the address to the graduates was delivered by Rev. Henry E. Cobb, D.D.

The degree of Doctor of Dental Surgery was conferred by Mr. John Boylston, vice-president of the board of trustees, on the following graduates:

Louis I. Abelson
Abraham Axelband
Philip Back
Abraham Berger
Harry R. Berglind
Harry Berler
Nathan Berlin
Sylvia Bernfeld
Siegfried L. Birenberg
Morris Black
Charles Blinder
John Bloomfield
Samuel Bogdonoff
Robert H. Brockmann
Abraham Brosterman
Sylvia Brull
Charles A. Chayes
Benjamin B. Chilton
Benjamin H. Cohen
Lawrence S. David
Selby J. Day
Willard A. Degnon
Ida Diamond
Lewis Ellis
Paul D. Elkind
Lillie Epstein
Clementine L. Fader
Isaac Farber
Rex W. Faulkner
Harry M. Feder
William A. Fennelly
Benjamin Finkenthal
David Fliegelman
Milton Friedman
Israel Freund
Felix B. Fuchs
Walter J. Geiger
Mary Ginsburg
Simon Glassman
Ward S. Goldberg
Frank M. Goldfarb
Edward L. Gerard
Emanuel Gordon
Meyer Gottesman
Saul S. Granetz
Samuel Greenberg
David Greenfeld
Celia T. Gromet
Herbert Gross
James H. Hardy
Nathaniel T. Harwick
Ernest M. Hass
Samuel Hemley
Oscar Henig
Isidore M. Hotchkiss
Henry O. Howgate
John J. Jaffin
James M. Jones
Abraham Kaplan
Phoebe I. Katz
Paul J. Keber
William Kemp
Max Kiesler
Jacques Kirsch
Abraham Klein
Matthew K. Klein
Oscar A. Kolthoff
Julius L. Langert
Jacob T. Lefkowitz
William A. Leslie
Abraham Levine
Abraham J. Levine
Benjamin Levine
Samuel H. Levy
Frank Lifschitz
William Lippman
Abraham Lipskar
Edward L. Littman
Charles A. McKevett
Robert L. McKinney
Lauretta D. McSpirit
Benjamin Mahler
Samuel Mamlet
Julius Marcus
Harold A. Meyer
Jochanan Minoff
Samuel Mohr
Frances B. Nash
Benjamin Pasternak
Morris Puchkoff
William J. Redmond
Rose Roth
Milton M. Rozsa
Ruth Rubin
Samuel Rubin
William Rubin
Louis Ruffine
Herman B. Sack
Isaac Salkin
Louise Schoenfeld
Rose Schulster
Arthur Schur
Leon W. Scott
Reginald M. Sharlach
Isaac Shendell
Raymond C. Sheridan
Russell C. Sherman
Emanuel M. Siegler
Benjamin D. Silverstein
Nathan Silverstein
Alexander L. Simson
Eldridge P. Smith
Robert L. Stormont
Frederick Suesholtz
Saul Sultan
Harry A. S. Tanenbaum
Cyril A. P. Waller
Jacob L. Weiss
Harry Werner
Clifford S. Wheeler
Benjamin E. Wiener
Louis Wilder
Francis W. Williamson
Nathaniel Wohl
Joseph Wolfman
Alexander C. Yule
William G. Zeller
Morris Zorn

The Thomas W. Evans Museum and Dental Institute School of Dentistry University of Pennsylvania.

At the annual commencement exercises of the Thomas W. Evans Museum and Dental Institute School of Dentistry University of Pennsylvania, held Wednesday, June 19, 1918, at the Metropolitan Opera House, Philadelphia, Pa., the degree of Doctor of Dental Surgery was conferred by Edgar F. Smith, Chem.D., Sc.D., L.H.D., provost, upon the following candidates:

Stuart G. Abel .....Pennsylvania
David A. Alberstadt .....Pennsylvania
Earl H. Albert .....Pennsylvania
Garrett Albrecht .....Pennsylvania
Luis C. Aleman .....Panama
Earl J. Allen .....New York
Harold E. Anderson .....New Jersey
Juan B. Arias .....Panama
Harvey M. Aungst .....Pennsylvania
Harold C. Bailey .....Pennsylvania
Bella B. Barash .....New York
Alexander R. Bartsch .....New Jersey
Joseph C. Bauer .....Connecticut
John A. Bauerle .....Chile
Leonard R. Becker .....Pennsylvania
Walter E. Bender .....New York
Abbott Berger .....New York
Walter J. Bernhardt .....New York
John W. Berryman .....New York
Cayetano Bethencourt .....Canary Island
Leon W. Bivins .....Pennsylvania
Ralph W. Boone .....Maine
William R. Borneman .....Pennsylvania
Clyde S. Bouton .....New York
Ernest H. Braem .....New York
Samuel Bragman .....New York
Edward Brailove .....New Jersey
Eulogius J. Brennan .....Pennsylvania
Harry N. Brenner .....Pennsylvania
Finn J. Brönner .....Norway
James E. Brown .....New Jersey
Roy H. Brown .....New Jersey
Russell C. Brown .....New Jersey
Vincent T. Buggy .....Pennsylvania
Louis A. Candela .....New York
Samuel M. Carter, Jr. .....Pennsylvania
Abraham de Castro .....Panama
Lawrence D. Christmas .....Pennsylvania
Harold O. Clappier .....Pennsylvania
Robert Clayton .....Pennsylvania
Herbert E. Cohen .....Pennsylvania
John T. Cologne .....Tennessee
Harold D. Colt .....Pennsylvania
Willard R. Conklin .....New Jersey
George W. Connell, Jr. .....New York
Charles S. Conover .....New Jersey
Morris L. Cooper .....Tennessee
Everett E. H. Covert .....New Jersey
Alberto J. Cuadra .....Central America
Walter H. Danforth .....Vermont
George C. Davis .....Pennsylvania
William H. Dean .....Pennsylvania
Seymour C. Deber .....New Jersey
Marshall G. Derk .....Pennsylvania
Rafael Deshon .....Central America
Joseph W. Dillon .....New Jersey
Lazarus A. Dughi .....Pennsylvania
Ralph G. Eveland .....New York
Gregorio Fabiani .....Italy
Henry W. Farrell .....New York
Henry A. Finestone .....Pennsylvania
Francis J. Fitzpatrick ...Pennsylvania
Chester D. Forkel .....New York
Herbert P. Frank .....New York
John W. Gabler .....New York
Carl C. Gage .....New York
David J. Ganey .....Pennsylvania
Julian I. Gifford .....New York
Julius I. Gifford .....New York
Holmes R. Gilhuly .....New Jersey
Charles A. Gilmartin ....Connecticut
Marco Giovagnoli .....Italy
James B. Gosnell .....Canada
Harry K. Gurnsey .....Utah
John J. Haas .....New Jersey
Warren L. Hafely .....New York
William R. Haller .....New York
Wilbur T. Harkrader ....New Jersey
Arthur W. Harrington ...Massachusetts
Whitton R. Hatfield .....New York
Robert W. Haycock, Jr. ..New Jersey
Ollington C. Hayes .....New Jersey
Robert M. Heilbrun .....New York
Robert A. Henke .....New York
Elam M. Hitchner .....New Jersey
Charles H. Hodgkins, Jr. .Maine
Leslie L. Hoke .....New York
Francis G. Hollar .....British West Indies
Elmer P. Hollingshead ...New Jersey
Ralph H. Honsberger ....Pennsylvania
Frank K. Horner .....New Jersey
Ashley E. Howes .....New York
Earle B. Hoyt .....New Jersey
Rudolph Hyman .....New Jersey
Meredith M. Jack .....Pennsylvania
Reginald R. Jacobs .....South America
Earl W. Jaynes .....Pennsylvania
Thomas R. Jenkins .....Pennsylvania
Wesley F. Jerauld .....Maine
Jay P. Jeter .....Pennsylvania
Ethan A. Johnson .....New York
Lewis S. Johnson .....Maine
Harold S. Jones .....Pennsylvania
Irving Joseph .....New York
Morris H. Jossem .....New York
Harry L. Keel .....North Carolina
Edward B. Keffer .....Pennsylvania
Howard R. Kidd .....Pennsylvania
Donald J. Klotz .....Pennsylvania
George Kobre .....New York
Samuel Konwiser .....New Jersey
Frederick H. Kroll .....Pennsylvania

Clyde D. W. Kuich ..... Pennsylvania
Thomas R. Lahey ..... New Jersey
Martin J. Larkin, Jr. .. Pennsylvania
Russell W. Leh ..... Pennsylvania
Walter L. Lehman ..... Pennsylvania
Albert Levy ..... New York
Benjamin A. Lincoln .... Pennsylvania
John H. Linehan ..... New York
Louis H. Loebel ..... Pennsylvania
Jacob H. Ludwig ..... Pennsylvania
James E. F. McCaffrey .. New York
Eugene V. McCawley ... Pennsylvania
Robert D. MacLean .... New Jersey
David L. Mackey ..... Pennsylvania
James V. Maloney ..... New Jersey
Sidney D. Marcovitz .... Pennsylvania
Victor A. Martin ..... New York
J. M. Maxwell ..... New York
Joseph P. Meehan ..... Connecticut
Walter Meier ..... Iowa
Albert R. Melnicoff ..... Pennsylvania
John Menzies ..... Australia
Joseph H. Meyer ..... France
Reuben E. Miller ..... Pennsylvania
Ernest J. Millhouse .... South Australia
Walter F. Minnerly .... New York
John V. Mochel ..... Pennsylvania
John W. Mooney, Jr. ... New Jersey
Harvey M. Moore ..... Pennsylvania
Mary M. Moore ..... Pennsylvania
Lewis J. Morgan ..... Pennsylvania
Francis W. Moynihan ... New York
Roy A. Muir ..... Australia
Robert J. Murray ..... New York
Kenneth S. Noyes ..... New York
James O'Brien ..... Pennsylvania
Howeth Pabst ..... New York
Aloysius A. Parker ..... New York
Henry S. Partridge ..... New York
Henry H. Pennock ..... Pennsylvania
Leon I. Phillips ..... Pennsylvania
Frederick W. Plugge ... District of Columbia
Leo G. Pollock ..... New Jersey
Justo Prieto ..... Porto Rico
Harry DeV. Reese ..... Pennsylvania
Theodore M. Reid ..... New Jersey
Roe E. Reilly ..... New York
Walter B. Reinhard ..... New Jersey
Noel A. Robbins ..... New Jersey
Harry L. Romine ..... New Jersey
Alexis Rosen ..... Pennsylvania
George J. Roth ..... Pennsylvania
Myron M. Rutstein ..... New York
James P. Ruyl, Jr. ..... New York
Aubrey P. Sager ..... Pennsylvania
Harry M. Sassaman ..... Pennsylvania
Otto Scheeren ..... Pennsylvania
George P. Schlafer ..... New York
Ella E. W. Schmelz ..... Pennsylvania
James H. Scholz ..... New York
Martin T. Shapiro ..... Pennsylvania
William R. Showacre ..... Pennsylvania
Ernest J. Simonetti ..... New York
William S. Simons .....
James A. Sloan, Jr. ..... Pennsylvania
Milton C. Smith ..... New York
Walter S. Smith, Jr. ..... Connecticut
Alexander Sosnowski ..... Pennsylvania
Ralph L. Spaulding ..... New York
Louis Stabinsky ..... New York
Harold A. Stamm ..... New York
Carl F. Steinhauer ..... Pennsylvania
David L. Stemer ..... New Jersey
Constantine Stephanis ..... New York
Arthur C. Strenkert ..... New Jersey
Preston J. Sturdevant ..... Pennsylvania
Martin M. Suter ..... Ohio
Michael Sutnick ..... New Jersey
Harold N. Taylor ..... Australia
Demetre Tentchoff ..... Greece
Frederick W. Thayer ..... Pennsylvania
Arthur R. Thomas ..... New York
Mabel F. Thomas ..... New Jersey
Albert M. Thompson ..... New Jersey
Arthur H. Tomlinson ..... New York
Henry L. Tomsuden, Jr. .... New York
Leland F. Tribe ..... Utah
Leonard W. Trott ..... South Australia
Francis P. Van Valin ..... Pennsylvania
Jose Vicente ..... Porto Rico
David K. Wagoner ..... New York
Leon Wainman ..... New York
Francis K. Walsh ..... New York
Ralph E. Ward ..... Pennsylvania
Charles S. Watts ..... New York
Richard J. Waugh ..... Virginia
Gertrude F. Weaver ..... Pennsylvania
Thomas B. R. Webster ..... Montana
Paul S. West ..... New Jersey
Kenneth E. M. Weyand ..... New Jersey
John L. White ..... Illinois
Abram B. Whitesell ..... Pennsylvania
George I. Wian ..... Pennsylvania
Joseph C. Wilson ..... New York
Gilbert M. Wiltbank ..... Delaware
Harry B. Wright ..... Pennsylvania
Miles D. Zimmerman ..... Pennsylvania

Degree conferred (as of class of 1917) at University Council, February 22, 1918:

Geo. A. Encherman James J. McMillan John Wm. Ross

Conferred January 16, 1918:

Carl Sorgenfrei

Laval University, School of Dental Surgery.

At the commencement exercises of the School of Dental Surgery of Laval University, held in Montreal, Can., the degree of Doctor of Dental Surgery was conferred on the following graduates:

Theo. Archambault	Honoré David	Arm. Hay	A. W. Maitland	Palma Racicot
Eug. Audet	Gaston Demers	Arist. Lacasse	Euclide Malo	L. Ringuette
Emile Bourdon	Henri Desroches	Léon Leduc	Auguste Massicotte	Arm. Sarrazin
Ch. Campeau	Bruno Dugas	L. C. LeSage	J. A. Pinault	R. E. Trudeau
Antonio Chevrier	Ch. Duquette	Cyprian Lévesque	Horace Pinet	Emile Venne
Geo. Cinq-Mars	Aug. Graton	Robert MacKay	Ed. Plourde	E. Vinet
Z. A. Côté				

The degree of Bachelor of Dental Surgery was conferred on the following graduates:

Ch. E. Beaulieu	Euclide Caza	Gustave Gouin	Edgar Larouche	Henri Provencher
Ludger Bissonnette	J. B. Dorval	Gratien Landry	J. B. Melançon	Geo. Pelletier
Moise Brassard	Clovis Denis	Antoine Loignon	Angelbert Milot	Rodolphe Philie
Jules Brière	Sam'l H. Feldman	Charles Larue		

St. Louis University, Dental Department.

The annual commencement exercises of the Dental Department of St. Louis University were held in St. Louis, Mo., on June 3, 1918.

The commencement address was delivered by Hon. C. J. Smyth, Chief Justice, Court of Appeals, D.C.

The degree of Doctor of Dental Surgery was conferred on the following graduates:

Sanford H. Allen	Missouri
Harry Baker	Illinois
Lee A. Bierk	Missouri
John A. Boudreau	Missouri
John F. Brandt	Missouri
Hugo H. Buescher	Missouri
Joseph F. Buxton	Illinois
William Cain	Illinois
James B. Cuthbertson	Illinois
Victor Droste	Illinois
Robert T. Eads	Missouri
Gus H. Eckert	Missouri
Sylvan Eisenstein	Missouri
John A. Evans	Ohio
Harry H. Fleischer	Missouri
George Franken	Ohio
Henry C. Fulkerson	Illinois
Paul H. Gattermeir	Missouri
Francis P. Gleeson	Ohio
Otho A. Gorman	Illinois
John J. Gormley	Missouri
Chester D. Grimes	Pennsylvania
Claude E. Grizzell	Illinois
Ambrose B. Harrington	New York
Francis M. Hayden	Missouri
George B. Herndon	Missouri
Henry Heyenga	Illinois
Claude D. Holder	Missouri
Garnett G. Hopkins	Missouri
Arden Hunt	Utah
Henry J. Huschle	Illinois
Murray Ipe	Indiana
Elmer A. Jasper	Missouri
Mark C. Kerr	Pennsylvania
Alphonsus J. Lager	Missouri
John H. McCutchen	Missouri
Paul L. Mallinckrodt	Missouri
Leo K. Manning	Missouri
William E. Nolting	Illinois
Walter G. Och	Illinois
Alfred Perry	Missouri
Earl J. Poe	Illinois
Walter K. Richardson	Missouri
Frederick J. Robertson	Arkansas
A. E. Seymour	Illinois
Loyd Shimmin	Utah
Walter G. Siemers	Missouri
John C. Skaer	Illinois
Howard S. Smith	Missouri
Leonard A. Smith	Arkansas
Edward F. Stallman	Illinois
Lou R. Starling	Missouri
John G. Stephens	Missouri
Zera L. Stokely	Missouri
Zeph W. Street	Missouri
Benjamin C. Thompson	Missouri
Everett Travelstead	Illinois
William F. Truetzel	Missouri
Ferdinand J. Vogelsang	Illinois
Edwin R. Wagner	Illinois
Frank J. Weicht	Indiana
George W. Williams	Missouri

Western Dental College.

At the annual commencement exercises of Western Dental College, held in Kansas City, Mo., the degree of Doctor of Dental Surgery was conferred on the following graduates:

R. H. Ahrens
E. K. Arnold
Glen Ault
W. E. Baker
J. D. Bast
G. G. Brown
J. E. Brown
C. N. Bucher
L. C. Cox
G. L. Crawford
H. R. Davis
J. H. Dillon
W. J. Doran
W. F. Drew
F. B. Farr
W. E. Foley
F. A. Foyle
J. H. Gilman
F. A. Greene
Miss J. Harris
Paul Hendrix
J. P. Hinkle
F. A. Holmes
P. C. Hopkins
H. E. Johnson
H. B. Johnson
J. A. Jones
V. Jones
J. T. Keeling
G. F. Kling
O. J. Koepke
Joe Manning
H. Neiswanger
L. J. Nipher
D. A. Pedroja
H. A. Potter
L. J. Reid
W. P. Ringo
L. O. Rippy
Mrs. C. B. Robinson
L. L. Sauder
R. V. Sheeks
C. Sheldon
Ben Simlevick
F. L. Soper
C. Stigdon
R. C. Sweeney
Ed. H. Thompson
G. T. Wallace
J. Wilhite
R. Wright
E. Zenor

Northwestern University, Dental School.

At the annual commencement exercises of the Dental School of Northwestern University, held in Evanston, Ill., on Wednesday, June 12, 1918, the degree of Doctor of Dental Surgery was conferred on the following graduates:

William H. Ackemann
Kemp G. Acker
George H. Aiken
Paul E. Allen
Allyn C. Bailey
Harry P. Barker
Kenneth A. Bignell
Hugh E. Black
Katheryn B. Bosma
Clyde C. Bowe
Frank P. Burman
George S. Carpenter
Sau Y. Chang
Harold W. Coe
William J. Collings
Ray S. Cooke
Myron F. Cramer
Percy P. Creuzot
Paul B. Cuolahan
Clark P. Currier
Emil K. Dahnke
Rolland C. Dalgleish
Reuben R. Davy
Herbert H. Deighton
Charles R. Deindoerfer
Wilbert F. Devery
Clarence A. Eberlein
Reuben H. Edgren
Arthur Elfenbaum
Henry Erdahl
Frederick W. Fauerbach
Cecil O. Fergusson
Hugo H. Fifield
Olin C. Fjelstad
Stanley H. Fluent
Claude J. Foley
Almon D. Fortney
Willard H. Fouts
Sidney B. Freud
Irwin R. Fried
Lila M. Frink
Orie J. Gates
Joseph E. Gillis
Ulysses G. Godowsky
Boyd C. Goodwin
Lester P. Graffin
Christian B. Gurslee
Arnold E. Halverson
Wayne L. Hamm
Edward L. Hay
John C. Heisler
Robert R. Henderson
Harper J. Hibbe
Harry J. Hoerner
Oscar H. Hoffman
Clarence W. Holtzman
Carl W. Holz
Joseph A. Hopkins
Frederick G. Huscher
Philip E. Hutson
Irvin L. Jacobson
Bessie A. Jaeger
Howard M. Johnson
Max M. Johnson
William J. Johnson
John J. Johnsten
Arthur H. Jonas
David A. Jones
Malcolm E. Kaffie
Kenneth K. Kendrick
Edward Kozlow
Martin G. Kuhre
Abraham Kulvinsky
Charlie F. Lindsey
Jacob L. Lippert
George B. Livingston
Hillyard H. Lockwood
Franziska L. Lowum
John A. McAnlis
Earl McGruer
John J. McGruer
Harold P. McLean
Cletus J. McNulty
Nathan M. Maggid
Harry Mann
Florence M. Mazur
Silas F. Mead
John H. Meyer
Colton B. Miles
Jerome J. Miller
James H. Mitchell
Norris Moen
Obed Moen
Earl L. Montgomery
John J. Moran
William P. Morison
Oscar B. Moulton
Benjamin Myers
Andrew J. Newell
Carl H. Norgren
Henry Oliver
James H. Olshan
Melrose B. O'Rourke
Ivar A. Oveson
Earl J. Palmer
Al L. Pastoret
Albert A. Pekarske
Carl E. Peterson
Robert M. Post
Leon H. Poundstone
Walter T. Poyer
George R. Qualley
Delvan W. Quilling
Frank J. Rader
Henry W. Ralstin
Herbert S. Ray
Clifford F. Recob
Charles J. Reinardy
Arthur L. Roberts
Henry P. Robinson
Clifford L. Robison
William D. Rooks
Byron L. Root
James S. Rosenblatt
LeRoy T. Rowland
John S. Rushing
George W. Sargeant
John W. Schlampp
Myron C. Schuman
William A. Schwab
Clarke B. Scott
Otho E. Scott
Albert H. Seeglitz
Harry E. Smith
Vincent H. Spensley
Carl G. Storberg
John J. Sugrue
Raymond J. Sweeney
James H. Thomson
Isidore Toppel
Stanley D. Tylman
Myron J. Umbach
Ray L. Varker
Harvey H. Vickers
Herman A. Von Ruden
Gerald E. Wadleigh
Parke H. Waggoner
William L. Warburton
Harold G. Wedell
Charles R. Wells
Henry P. Westaby
Peter Westby
Frank R. Westerdahl
Jerome L. Wilhermsdorfer
Herbert F. Wilke
Ellis L. Wills
Samuel Wineburgh
Max Wishner
Andreas A. Wollmann, Jr.
William Wood
Donaldo R. Young
Kim C. Zane
Andrew W. Zeis

Western Reserve University, Dental School.

At the annual commencement exercises of the Dental School of Western Reserve University, held in Cleveland, Ohio, 1918, the degree of Doctor of Dental Surgery was conferred on the following graduates:

C. W. Albers	A. E. Drach	R. P. Jones	E. M. Rawson	J. A. Sweeney
A. M. Allen	I. H. Glucksman	K. G. Kibbee	C. H. Scheu	J. E. Szabo
F. J. Beutel	R. J. Goggin	M. A. Kondik	T. H. Schmidt	R. G. Wells
G. S. Briggs	E. J. Griffiths	Burt Miller	Eva H. Shapiro	C. M. White
R. E. Creig	G. U. Griffiths	B. E. Moehlman	H. F. Shriber	B G. Winterick
N. S. Christian	H. G. Hood	J. J. Morrison	Jacob Silverberg	E. W. Zeleznick
Stephen Cziprus	F. J. Horrigan	Norma B. Plaisted	C. J. Stark	F. I. Zralik
J. R. Davenny	H. H. Jamison	E. J. Raus	C. W. Sund	

Philadelphia Dental College (Temple University).

At the annual commencement exercises of Philadelphia Dental College (Temple University), held in Philadelphia, Pa., the degree of Doctor of Dental Surgery was conferred on the following graduates:

Tomoji Abe	Japan
Archibald R. Abrams	Pennsylvania
Jorge Alvarez	South America
Venanzio Angelucci	Pennsylvania
Alberto A. Bertrand	Central America
John H. J. Baker	Virginia
Samuel A. Baker, Jr.	Maine
Ladislaus J. Balaso	Pennsylvania
John D. Barab	New Jersey
Robert Barnes	Pennsylvania
Frank W. Boland	Pennsylvania
Leon Braunstein	New York
Ignatius C. Brennan	Pennsylvania
Thomas Bright	Pennsylvania
Willard S. Broomell	Pennsylvania
Theodore S. Carlitz	Pennsylvania
Joseph F. Chermol	Pennsylvania
George F. Cleary	Pennsylvania
George F. Cherry	Pennsylvania
Leo A. Collins	Pennsylvania
Joseph J. Connolly	Pennsylvania
Daniel A. Culhane	Pennsylvania
Charles H. Culver	Pennsylvania
Wilbur C. C. Dillman	Pennsylvania
Anthony R. Di Nubile	Pennsylvania
Leon B. Dolan	Pennsylvania
Patrick L. Donahoe	Pennsylvania
Vincent P. Donahue	Pennsylvania
Edward J. Doyle	Pennsylvania
Patrick H. V. Dunphy	Pennsylvania
Alexander G. Edgar	Pennsylvania
J. Samuel Fisher	Pennsylvania
James R. Flexer	Pennsylvania
Thaddeus B. Fowler	Pennsylvania
Peter A. Frank	New Jersey
Thomas G. Gallagher	Pennsylvania
Thomas J. Gallagher	Connecticut
José F. Gasteazoro	Central America
Robert C. Gilroy	Pennsylvania
Harry H. Goldner	Connecticut
Rubin Goldstein	Pennsylvania
Clyde D. Grooby	New Jersey
John S. Guzman	Central America
James B. Heffner	Pennsylvania
William R. Horn	Pennsylvania
Arnold E. Hughes	Germany
Alfred Jenkins	Pennsylvania
Herbert W. M. Jepson	Connecticut
Reuben T. Johnson, Jr.	New Jersey
Mustafa K. Assure	Egypt
Frank M. Killeen	Pennsylvania
William B. Landisberg	Pennsylvania
Makoto Matsuzoye	Japan
Joseph H. McCrory	Pennsylvania
Joseph A. Murray	Pennsylvania
Stanton W. Myers	New York
Paul G. Offley	Pennsylvania
Bernard A. O'Hara, Jr.	Connecticut
Jacob H. Ouslander	Pennsylvania
John J. Pavlik	Pennsylvania
Abraham L. Phillips	New York
F. Eduardo Portugal	South America
Myer J. Quartner	Pennsylvania
Lewis W. Robinson	Pennsylvania
Frank S. Rothenberger	Pennsylvania
Archie A. Salsbury	Connecticut
Albert V. Savage	Pennsylvania
Harry A. Schell	Pennsylvania
Gordon W. Schurch	Pennsylvania
Errol F. B. Shope	Pennsylvania
Harry Sloan	Pennsylvania
Selwin V. Stickler	Pennsylvania
Eugene F. Sullivan	Massachusetts
Charles A. Sutliff	New Jersey
Tokuzo Takemura	Japan
James E. Tarter	Virginia
William H. Taylor	New Jersey
Vhaness A. Thomas	Arkansas
Miguel A. de la Torre	Cuba
Raymond C. Walters	Pennsylvania
Catherine M. Waters	Pennsylvania
Edwin T. Weinstein	Pennsylvania
Maurice S. Weinstock	Pennsylvania
Peter E. Wilkins	Connecticut
Samuel M. Zimmerman	Pennsylvania

Atlanta-Southern Dental College.

At the annual commencement exercises of Atlanta-Southern Dental College the degree of Doctor of Dental Surgery was conferred on the following graduates:

Hunter S. Allen ..... Alabama
Gerald F. Altee ..... Florida
Vincent J. Altee ..... Florida
Ary E. d'Armona ..... Florida
Stephens L. Baldwin ..... Georgia
Gordon K. Barkley ..... Tennessee
T. Franklin Bean ..... Indiana
William T. Belford, Jr. ..... Georgia
Charles C. Bennett ..... North Carolina
Henry A. Benton ..... Tennessee
Philip C. Blount ..... Louisiana
Charles R. Brice ..... Georgia
Charles H. Bryan ..... North Carolina
Harold C. Bugg ..... Georgia
Ernest H. Burger ..... Georgia
Joseph A. Bussell ..... Georgia
George S. Callahan ..... Georgia
J. Frederick Campbell ..... North Carolina
Samuel T. Carr ..... Georgia
Henry W. Catron ..... Tennessee
Huddie L. Cheney ..... Georgia
Arthur H. Coker ..... Alabama
P. Brooks Conner ..... South Carolina
J. Cecil Crank ..... Virginia
W. Clyde Current ..... North Carolina
Samuel H. Dickey ..... Alabama
Miron J. Doub ..... North Carolina
C. Lewis Douglas ..... Georgia
L. Justice Dupree ..... North Carolina
Samuel M. Easley ..... Georgia
Grady W. Eason ..... Alabama
Alfred C. Edwards ..... North Carolina
J. Thomas Endsley ..... Alabama
James Y. Folsom, Jr. ..... Florida
William B. Ford ..... Alabama
Bernet Friedman ..... New York
Irvin S. Futch ..... Florida
Steve A. Garrett ..... Georgia
Marion A. Gilliland ..... Louisiana
James S. Griffith ..... Mississippi
Victor C. Grubbs ..... Georgia
Chalmers D. Haddon ..... South Carolina
John C. Harbour ..... Mississippi
Emmette E. Harmon ..... North Carolina
John A. Hartsfield ..... Georgia
George B. Head ..... Georgia
Ford D. Henry ..... Louisiana
William D. Hogan ..... Georgia
Booth Hope ..... Arkansas
Enoch S. Howze ..... Arkansas
Earl W. Hunter ..... North Carolina
Robert F. Ingram, Jr. ..... Georgia
Charles E. Jenkins ..... North Carolina
Charles A. Johnson ..... Georgia
Floyd G. Johnson ..... North Carolina
Charles H. Jones ..... Mississippi
Edgar D. Jones ..... North Carolina
Albert C. Kemp ..... Mississippi
Barney B. Kennedy ..... Mississippi
William E. Lanan ..... Illinois
J. Kellum Levie ..... Georgia
Arthur F. Link ..... Georgia
Quince G. Logan ..... North Carolina
Henry W. McDonald ..... North Carolina
Kleber C. Maddox ..... Georgia
Andrew J. Mills ..... Alabama
Nick M. Medford ..... North Carolina
William C. Mercer ..... North Carolina
Louie W. Mitchell ..... Mississippi
Italy M. Morse ..... North Carolina
Emmett R. Munford ..... Georgia
Rozier C. Murphey ..... Louisiana
Henry M. Needham ..... Florida
Alexander Newton ..... North Carolina
J. Harvey Nicholson ..... North Carolina
William G. Nimocks ..... North Carolina
Howard J. Nolan ..... Pennsylvania
Harle L. Parks ..... Tennessee
McCurry M. Parks ..... Georgia
Casimir P. Patrick ..... South Carolina
Charles C. Poindexter ..... North Carolina
D. LeRoy Pridgen ..... North Carolina
Robert A. Rainer ..... Mississippi
R. Glenn Reed ..... Georgia
Horace C. Rippy ..... South Carolina
Helen A. Robinson ..... Pennsylvania
Joseph R. Rutland ..... Alabama
Curtis E. Rutledge ..... Louisiana
John T. Rutledge ..... South Carolina
Hugh M. Sanders ..... Georgia
C. Bartow Shipman ..... Alabama
Eugene Y. Smith ..... South Carolina
Lonnie G. Smith ..... Texas
Drue I. Stallings ..... North Carolina
George M. Stamper ..... Mississippi
Clifford C. Steele ..... North Carolina
Walter H. Sunderman ..... Illinois
Berlin C. Thomasson ..... North Carolina
Cammie J. Thrailkill ..... North Carolina
J. Ross Tucker ..... Georgia
M. Ione Turner ..... Georgia
Joseph V. Turner ..... North Carolina
Percy W. Warrenfells ..... Tennessee
W. Charles Weatherman ..... North Carolina
Clyde O. Wells ..... Georgia
Frank D. Wesley ..... Georgia
J. Frank West ..... North Carolina
Jesse L. West ..... North Carolina
A. L. Wetsel ..... Texas
G. Owen Wheless ..... Georgia
Donald White ..... Georgia
Ernest I. White ..... Tennessee
Houston Wilson ..... Alabama
Harry E. Wood ..... Florida
R. L. Wood ..... Louisiana
Charles B. Yount ..... North Carolina

Army and Navy Dental News

Enlistment in Medical Enlisted Reserve Corps

OF

Students in Well-recognized Dental Schools.

THE following circular for the information of dental students has been issued from the Surgeon-general's office, Washington, D. C.:

1. The applicant secures from his local board a certificate showing that he is not in the current quota.

2. The applicant makes out an application for permission to enlist following in every particular Form ASGS.

3. The certificate of the local board and the application for permission to enlist are given to the dean.

4. The dean attaches his affidavit (following one of the Forms DVS) and makes a record of having issued the affidavit.

5. The dean sends the application, the certificate of the local board, and the affidavit by mail to the Surgeon-general of the Army (*Personnel* division, Section on Medical Education, Washington, D. C.). (This *entire* address should appear on envelope to avoid delay.)

6. If approved, the Surgeon-general's office issues a permit and sends it to the dean.

7. The dean records receipt of this permit on his register of affidavits issued, and gives permit to the applicant.

8. The applicant makes out an application to enlist following Form ARO, and presents this with the permit to a recruiting officer.

9. The recruiting officer receives the man for enlistment and either gives him a physical examination or sends him to a medical officer of the army for physical examination.

(*a*) If the applicant is rejected on account of minor defects only, the examining officer will, upon request, forward a copy of the physical examination to the Surgeon-general for consideration of waiver of these defects.

10. After enlistment is completed, the applicant should secure a certificate of enlistment from a *medical officer* of the army. If the recruiting officer is not a medical officer, he should be asked to furnish a statement of the fact of enlistment, which may be presented to the medical officer who made the physical examination as a basis for this certificate.

11. The applicant presents this certificate of enlistment to his local board as a basis for deferred classification.

12. The applicant notifies the officer of his school who made the affidavit, of the date and place of enlistment, and this is entered by the officer on the register of affidavits.

A careful following of these steps will expedite enlistment and save much time and useless correspondence. The Surgeon-general's office cannot furnish supplies of this circular or of forms of application and affidavit, but there is no objection to the school issuing copies to men who are now or soon will become eligible for enlistment.

By direction of the Surgeon-general:

F. C. WAITE, *Captain, Sanitary Corps, N. A.*

May 20, 1918.

Recruiting of Student Nurses for the Army.

A NATION-WIDE campaign to recruit 25,000 student nurses, both for the Army School of Nursing and for all accredited training-schools connected with civilian hospitals is to be launched on July 29th.

It will be conducted under the direction of the Woman's Committee of the Council of National Defense upon the request of the Committee on Nursing, General Medical Board. It will be strongly supported by the co-operation of the Surgeon-general's office, the American Red Cross, and of the General Medical Board and State Councils Section of the Council.

It is designed to be a direct appeal from lay women to the young womanhood of America to enter upon a course of nurse training. The appeal will be made on the basis that every day of a student nurse's training represents a double patriotic service, in that while she is preparing for military duty later,

she releases a graduate for military duty now and herself cares for the civilian population.

The Committee on Nursing and the Woman's Committee join me in urging the medical profession through our state and local committees to encourage the families of their patrons to respond to this call; and also to lend their hearty co-operation during the recruiting days. It is especially desirable to use this opportunity to point out the fact that the maintenance of local hospitals and the training schools connected with them is an imperative community obligation.

FRANKLIN MARTIN, *Ch'man Med. Board, Council of National Defense.*

WASHINGTON, D. C., July 3, 1918.

Enough Army Dentists.

THE dental requirements of an army of more than 5,000,000 men can now be met by the present force of the dental corps of the American army. Examinations for dental officers have been closed, and no further additions will be made to the corps for at least six months. At the time the United States declared a state of war to exist between this country and Germany the total number of dental officers was 58. The present force numbers 5810. Commissions were offered to 5467 dentists in all parts of the country, and all but 271 were accepted, a percentage of 95.1. A school for dental instruction has been started at Fort Oglethorpe, Ga. Eighty-five dental officers are assigned each month to take the two months' course. The first month is given over to 180 hours of general military instruction and training, and the second to 70 hours' special military training and 100 hours devoted to professional subjects that have a definite relation to general practice of dentistry as it should be conducted in the army. Special dental infirmaries have been established in the camps and cantonments in this country, to which every newly inducted soldier is sent for examination shortly after arrival in the camp. In those cases where men need attention it is given. The average number of tooth fillings is from 225,000 to 250,000 a month. This figure does not include the examinations, treatments, extraction, or crown, bridge, and plate work. The practice followed in the camps is to first give treatment to those cases that require immediate attention. Special attention is paid to determining the number of chronic infections associated with teeth. It has been found that a number of diseases incapacitating men for military service are traceable to chronic infections about the teeth. Dental inspectors are constantly visiting camps and cantonments to inspect work done by the camp dentists in order to determine if the dental officers are competent, are correctly assigned, and to report on the general efficiency of the units. The same thorough care that is given to the men in this country is also given to the men in France. With each base, general, or evacuation hospital there is attached a specialist in plastic surgery to correct deformities of face and jaws. Dental surgeons who have been specially trained in this class of work are also assigned to such hospitals. —*Army and Navy Register.*

"The Army's Teeth."

BRITISH ARMY.

MR. J. P. LEEMING writes from Parkside, Great Clowes st., Higher Broughton: "As dental surgeon to seven Red Cross hospitals, I can testify to the state of the army's teeth. Many of the men have been invalided home with chronic stomach trouble due to bad teeth: and others who are wounded have not the same rapidity of recovery when all their food has to pass through a mouth full of septic teeth. From data which I have carefully taken I find that most of these men had bad teeth when they entered the army and were sent out to the front without dental treatment. All the qualified dentists serving in the army as combatants should be used as dentists, where they could render fit thousands of men otherwise unfit for active service. The dentists have not been slow in offering their services. I was informed in 1915 that there was a waiting list of over 800 dentists who had offered their serivces to the War Office. This list will now be much longer, and the majority are still waiting." —*British Journal of Dental Science.*

The American Army in France.

IN the course of a remarkably interesting review which Mr. Edward Marshall, a correspondent of the *Observer*, had with General Pershing, the general made the following comments upon marginal gingivitis: "The general physical health is of the best. 'Trench mouth' is not uncommon among the British Tommies, and our men have begun to know a little of it, but they never will be generally victims of it as the British and French were for a time, and even are today, because their teeth have for the most part been better cared for than those of their allies." This is a remarkable tribute to the high importance which the commander of the American army attaches to the preventive power of dental treatment in adding to the number of combatants borne upon the active roll of the army. —*British Dental Journal.*

Naval Dental Corps.

THE provision for the Naval Dental Corps as finally agreed to by the Senate and House limits the rank of dental officers to that of lieutenant-commander instead of commander, as provided in the Senate amendment, and strikes out the provision requiring confirmation of appointments. While the rank is limited to lieutenant-commander, provision is made for pay and allowances to the rank of captain and commander. This was done to prevent a conflict in authority. This meets the wishes of the Secretary of the Navy, who made the following statement concerning the proposed legislation:

"The appropriation bill, as it now stands, provides roughly for 13 dentists with the rank of commander. The department believes that dental officers should not be commissioned in a grade above that of dental surgeons with the rank of lieutenant-commander, for the reason that it now has no billets, nor can it foresee any billets in the future, in which a dentist of such high rank can be employed, certainly not to the number of 13. It is the policy of the department to give increase in rank only when such is necessary to facilitate command and administration for the purposes of war or preparation for war, and never as a matter of personal reward. Its recommendations to Congress in the matter of rank have been on this ground solely. It, however, believes that dental surgeons of long service should be permitted to have an increase of pay up to and including that given to a captain in the navy."—*Army and Navy Register.*

[SEE also page 733, "Naval Appropriation Bill—Provision for the Naval Dental Corps," under Dental Legislation.—ED.]

Examination for Naval Dentists.

EXAMINATIONS were begun this week to fill prospective vacancies in the Naval Dental Reserve corps, due to the increases allowed in the current appropriation bill. These examinations were held in Washington, New York, Philadelphia, Norfolk, Great Lakes, and San Francisco. The complement of the naval dental corps is 1 : 1000 of the total *personnel.* Over 300 are allowed at present, and when the Navy bill passes, over 100 additional vacancies will be created. The present examinations are for the purpose of making appointments in the reserve only, the minimum age limit for which is twenty-one years. An examination for the regular service was held some time in October.—*Army and Navy Register.*

Vincent's Angina Among the Troops in France.

DURING the last two years there has been a gradual and marked increase in the number of cases of Vincent's angina among the troops in France, both British and French. In time of peace this disease forms about 2 or 3 per cent. of all cases of throat complaints among the French army (recent statistics). Recent statistics from a British military hospital in France show the proportion to be as high as 23 per cent. The following notes are based on a number of cases which have come under my observation:

SYMPTOMS.

The disease is characterized by the formation of ulcers on the buccal and pharyngeal mucous membrane, either superficial or deep, covered by a pseudo-membrane—the most common site is the tonsil. The organism is one normally present in the mouth of healthy individuals, but seems to favor irritated conditions of the mucous membrane. Vincent himself considers excessive smoking one of the chief predisposing factors, as also the presence of decaying organic matter, and any irritating fumes, such as those given off by exploding shells. It is a disease prevalent among students working in the dissecting-room, and in hospitals generally, and among nurses. The onset is sudden, and may be preceded by a few days' malaise. The temperature is raised for the first day or two, and may be high, the membrane often not commencing to form for twenty-four to forty-eight hours after the commencement of the fever. The membrane is rapidly formed, is thick and abundant, and appears, as a rule, on one tonsil at first. After the first two days the temperature may fall to normal, and remain normal, or there may be an irregular slight pyrexia throughout. This more often occurs in the more severe type with complications, such as marked adenitis or albuminuria, etc. The membrane is yellowish white and abundant, it is adherent, and leaves a raw bleeding surface on removal. Although the tonsil is generally the part affected, the ulcer may be found only on the anterior or posterior pillar of the fauces, or the uvula alone, or the soft palate alone. It may commence on the tonsil, and spread to the uvula, pharyngeal wall, or soft palate, causing considerable destruction of tissue. The breath has an unpleasant odor, worse than in the case of diphtheria. As a rule, if thoroughly treated, the membrane disappears in a few days. In some cases, however, some days or as much as a fortnight after recovery, there

is a further rise of temperature, and commencing ulceration of the other tonsil. A chronic or severe form is sometimes seen, persisting for some weeks, and in these cases complications arise, and may be serious. Some cases of death have occurred in French hospitals in which the primary cause was Vincent's angina.

ETIOLOGY.

Microscopically, two varieties of organisms are found, the bacillus fusiformis and Vincent's spirochete. Two forms of Vincent's angina are met with—(1) the pseudo-membranous, resembling diphtheria in appearance, and (2) the ulcerative form. In the first we find abundant bacilli mixed with cocci; and in the second, associated with the bacillus, a Gram-negative mobile flagellated spirillum. A coexisting streptococcal infection is not uncommon, and may give rise to serious complications. The Ziehl-Neelsen method is all that is required, though the silver method demonstrates the spirochete more clearly. Injected into animals the organisms are non-pathogenic. Injection of impure cultures causes abscesses in which the spirochete is abundant. Letulle states that in every case of ulceration in the mouth, whether syphilitic, tuberculous, or cancerous, large numbers of B. fusiformis and spirilla are to be found.

COMPLICATIONS.

The complications which may occur are adenitis of the cervical glands in nearly every case, and often very painful.—CAPT. R. J. C. BOUTY, R.A.M.C.

—*British Medical Journal.*

Promotions.

Dental Reserve Corps.

THE following appointments (promotions) are announced (June 15th):

To be CAPTAINS: 1st Lieuts. Louis G. Prendergast, Donald M. Gallie, Jr., and Conrad E. Mortensen.

Announced June 22d:

To be MAJOR: Capt. Richard C. Kiebler.

Announced July 6th:

To be CAPTAINS: 1st Lieuts. Howard A. Reid, Fred L. McAninch, Arthur H. Nobbs, Henry O. Lineberger, Carlton B. Leighton, Walter E. Miller, Pope L. Marshall, Francis E. Derham, Solomon J. Z. Gantz, Henry H. Braxtan, Frank H. Cushman, Albert B. Crutcher, Carl M. Holland, Emory O. West, Fielding M. Wilhite, John B. Williams, Robert M. Schell, Thomas H. Tye, George K. Patterson, Courtney J. Murphy, Alexander W. McClean, Nealie E. Ross, Robert A. Adkins, James H. Johnson, Matthew A. Boykin, Frampton W. Farmer, John H. Davis, Edward M. Atkinson, Harry B. Laird, Neal D. Williams, Wm. D. Rush, Elliott H. Rowland, Walter E. Lowrie, George G. Starke, Homer T. Kemper, John L. Remsen, Harvey B. Haselton, Max F. Gruber, Fred A. Beaty, James C. Campbell and Clarence A. Flanagan.

Assignments.

Army Dental Corps.

Week ending June 15th.

Maj. James G. Morningstar from present duties at Camp Bowie, Tex., to Camp Gordon, Ga., for duty as camp dental surgeon.

Maj. William Mann from present duties at Camp Zachary Taylor, Ky., to duty as camp dental surgeon.

Week ending June 22d.

Col. Franklin F. Wing from present duties at headquarters, Western department, and to duty as Western department dental surgeon.

Maj. Bruce H. Roberts from duty at Columbus Barracks, Fort Sam Houston, for duty with evacuation hospital 17.

1st Lieut. Roy C. Starr from duty at Camp Dix, N. J., to Deming, N. M., Camp Cody, for duty.

1st Lieut. Earl T. Dickman honorably discharged.

Week ending July 6th.

Maj. Bruce H. Roberts from duties with base hospital 2, Fort Bliss, to Fort Sam Houston for duty with evacuation hospital 17.

1st Lieut. Wm. J. R. Akeroyd from duties at Camp Zachary Taylor, Ky., to duty with evacuation hospital 18, that camp.

1st Lieut. Samuel J. Lewis from duties at Camp Meade, Md., to Alexandria, La., Camp Beauregard, for duty with base hospital 102.

Dental Reserve Corps.

Week ending June 15th.

Maj. Grove W. Dunham at Camp Custer, Mich., to duty as acting division dental surgeon.

Week ending June 22d.

Maj. Joseph A. Boarts to Columbia, S. C., Camp Jackson, for duty with evacuation hospital 14.

Maj. John McD. Eveleth to Camp Greene, N. C., for duty with base hospital 54.

Week ending June 29th.

Maj. John Voss to Rockford, Ill., Camp Grant, for duty with base hospital 58.

Preparedness League of American Dentists.

ORGANIZED UNDER THE AUSPICES OF THE N. D. A.

THE DENTAL COMMITTEE OF THE GENERAL MEDICAL BOARD, WHICH IS THE AGENCY FOR THE MEDICAL AND DENTAL PREPAREDNESS IN THIS WAR EMERGENCY, HAS MADE IT POSSIBLE FOR EVERY DENTIST IN THE UNITED STATES TO ASSIST IN THE WORK, UNDER THE SUPERVISION OF THE PREPAREDNESS LEAGUE OF AMERICAN DENTISTS. HEADQUARTERS AT 50 EAST 42D ST., NEW YORK, N. Y.

Circular from Director-general Charles F. Ash,

115 BROADWAY, NEW YORK, N. Y.

THERE are just two classes of people in this country—those who are helping to the limit of their ability to win the war, and those who are not.

If you are a patriotic citizen you have no business in the latter class.

We are in this war to a successful finish, no matter how long it may take; and the quicker and more effective our health is, the shorter will be the struggle.

We must stop at no sacrifice, personal or financial, that the emergency may require.

We must consider our time and our capacities to be subject to conscription by our Government.

Let us translate our patriotism into action. The Government needs your help.

Let us make a clear declaration that we will back our Government with everything needed to help rid the world of this German menace which has brought the war to our very doors by sinking ships in American waters.

Our best opportunity is by making more men dentally fit, and thereby showing our determination to hasten our participation on the scale necessary for victory.

Our profession is going on record.

There are about 48,000 dentists in the United States.

Of this number 16,000 have joined the Preparedness League and agreed to give at least *one hour each day* of free service, including materials, to help make our boys dentally fit.

What is the matter with the other 32,000? Are they any less patriotic? I believe not. A few of them are doing free dental service for our boys, but have not joined the League. The others? Well, we are partly to blame in not having made them see the need for their help.

The inclosed report* shows 419,000 free operations performed for the men of our Army, Navy, and Marine Corps, but principally for those registrants who have been certified in Class 1A for our National Army.

We have 3,000,000 men under arms, and have done for them only 419,000 operations. Don't you see we need your help?

The wonderful work being done by Provost-marshal-general Crowder and his corps of able assistants in securing an army worthy of taking its place by the side of our Allies, must be backed up by every member of our profession who is physically able to practice.

Every boy made dentally fit increases the efficiency of our National Army. Kipling says:

It ain't the guns nor armament nor funds that they can pay,
But the close co-operation that makes them win the day;
It ain't the individuals, nor the army as a whole,
But the everlastin' team-work of every bloomin' soul!

If you want to join the army that stays at home to help make our boys fit to fight, sign the inclosed application blank and forward as directed. Do it now.

If you are already a member, give the application blank to one who is not, and *see that he joins.*

TO DENTISTS ON LOCAL BOARDS AND MEDICAL ADVISORY BOARDS:

Through the work done by the League, dentists were placed on every medical advisory board and a volunteer dentist on every

* [A later statistical report similar to that published in the DENTAL COSMOS for July, at page 651.—ED.]

local board in the United States. These men are doing an immense service to their country.

To the men on the advisory boards, let me say that where registrants certified for Class 1A come into your hands who have less than the minimum dental requirements, you should get in touch with the dentist on the local board that sent such registrant. Mention the case by name and order number, and call attention to the regulations as found in the new Selective Service Regulations, form 75, pages 15 and 16, sections 47 to 52.

To the volunteer dentists on local boards: Many registrants have been certified for Class 1A and sent to camp who have less than the minimum dental requirements—some, even, with full upper dentures. This causes injustice to the registrant, expense to the Government, and embarrassment to your board. It is your duty to secure a copy of the new Selective Service Regulations, form 75, from the clerk of your board, and familiarize yourself with the dental regulations, page 15. You should assist the medical member of your board where requested, by examining the mouth and teeth of all registrants.

Last, and not least: It is your duty to secure the name, address, and order number of every registrant for Class 1A who desires free dental treatment, and immediately put them in touch with the Preparedness League of American Dentists, so that there will be ample time for them to receive dental attention before going to camp. Don't wait until the registrants are ordered for entrainment, but send them for dental treatment as soon as they are classified in Class 1A.

The dentists on local boards occupy the most important position in relation to the dental condition of our National Army. The kind of service rendered by you will largely determine the success or failure of our efforts.

If any volunteer dentist assigned to a local board has difficulty in securing recognition by his board, he should promptly report his case to the Preparedness League director for his state, who will see that the matter is promptly taken up by the Adjutant-general of the State.

The governors of the various states and their adjutants and medical aides have been giving us splendid co-operation, and stand ready to assist us in performing our patriotic duty.

Herewith is a copy of a letter which every member should read. [See following letter.]

Chas. F. Ash, *Director-general.*

July 2, 1918.

(Inclosure.)

War Department: Office of the Provost Marshal General,
Washington, June 8, 1918.

Dr. J. W. Beach, Pres. Preparedness League of American Dentists, Buffalo, N. Y.

Dear Sir,—This is to acknowledge your favor of June 4th, and to say that, together with inclosures, it has been carefully noted. This office very much appreciates the incalculable value of the work your League is doing, and the prompt and full co-operation of its officers with the Government.

In the course of the enormous work you are doing misunderstandings have necessarily arisen between dentists and the registrants for whom they were voluntarily working, but such misunderstandings are by no means confined to the profession of dentistry. We realize that some who are able and ought to pay for dental services rendered will try to get service without payment. This, of course, is not contemplated by any fair-minded person, much less by the Government. Registrants who are able to pay for the necessary work ought to do so, and those demanding very expensive work, or more than is necessary to fit them for military service, ought at least to pay the expense.

In order, however, to avoid any misunderstandings, and to prevent any possibility of abuse or scandal, I think there should be no attempt whatever to differentiate between those who may and those who may not be able to pay, so far as concerns the actual work necessary to fit for military duty. I think the rule ought to be clearly and fully announced, that any registrant who is sent to one of your members and presents himself for treatment, comes as a result of a statement that the work is to be done without cost to him, just as if he were already in the service and were being treated by army surgeons, and is to be given such treatment as may be necessary, without any thought or inquiry as to whether or not he is able to pay. If he voluntarily and without demand offers to pay what he can, or if he requests additional treatment beyond what is absolutely essential, that is a matter of agreement between him and the dentist.

I hope I have made myself perfectly clear, and am sure that you agree with the proposition I have advanced.

I hope that you will convey to the members of the League the assurance that the value of the magnificent patriotic work it has undertaken and is performing is fully appreciated not only by this office and by the War department, but also by all our people to whom it is day by day becoming better known.

Very truly yours,

J. S. EASBY-SMITH, *Lieut.-Col. N. A.,*
Chief, Law Division.

SOCIETY NOTES AND ANNOUNCEMENTS

NOTICES should reach the Office of the DENTAL COSMOS not later than the 11th or 12th of the month preceding that of publication.

TWENTY-SECOND ANNUAL MEETING

OF THE

NATIONAL DENTAL ASSOCIATION.

Chicago, August 5, 6, 7, 8, and 9, 1918,

AT AUDITORIUM AND CONGRESS HOTELS.

At this the Sixtieth Anniversary of Organized Dentistry the G. V. BLACK MEMORIAL *will be dedicated. The unveiling of the monument will take place on Thursday, August 8th, at* 2 P.M.

MONDAY, August 5th.

The Registration office will be open Monday morning at 8.30 o'clock.

The members of the House of Delegates will present their credentials and be seated at 10 A.M.

This will be the official business day of the meeting.

TUESDAY, August 6th.

9.30 A.M.

Seminar—The Management of Pulpless Teeth.

Six of the best-known scientific research workers will submit "evidence and not opinions" on the subject.

2.00 P.M.

Three Section Meetings.

The Section on Prosthetic Dentistry and Crown and Bridge Work will render a program on "Occlusion and Variable Occlusion" and "A Scientific Technic in the Construction of an Artificial Denture."

The Section on Oral Surgery and Anesthesia will present a program on "Cleft Palate and Harelip Procedures" and "Recent Progress in the Management of War Injuries of the Face and Jaws."

The Section on Orthodontia and Periodontia have arranged for the following program:

"A Classification of Pathological Conditions of the Mouth."

"Physiological Factors as Related to the Peridental Membrane, Cementum, and Bone in Tooth Movement."

"Orthodontic Appliances and the Gingival Tissue."

"The Histology and Development of Cementum."

"The Duty and Responsibilities of the Orthodontist in the Present War."

"The Necessity for Orthodontic Interference in Malocclusion of the Teeth."

8.30 P.M.

Military Dentistry—War Surgery.

The speakers at this session will be surgeons of national and international reputation.

WEDNESDAY, August 7th.

9.00 A.M.

Six Section Programs and Oral Surgery Clinics.

The Sections on Operative Dentistry, Materia Medica and Therapeutics, Organization, Mouth Hygiene and Public Service, Research, The Preparedness League of American Dentists, and General Oral Surgery Clinics, will each present their programs in various rooms in the Auditorium and Congress Hotels.

2.00 P.M.

The Sections on Prosthetic Dentistry and Crown and Bridge Work, Oral Surgery and Anesthesia, and Orthodontia and Periodontia, will hold their second sessions.

8.00 P.M.

Canadian Dentists, Our Guests.

How fitting it is, when the young men of the Allied countries are freely and willingly giving their lives in the terrible conflict which is absorbing the attention of the entire world, when men and women in every station of life are making their first business the winning of the war, that the dentists of Canada and the United States should unite in holding their National meetings. The Canadian Dental Association will be the guests of the National Dental Association at this meeting, and the program for the Third General Session for Wednesday evening will be furnished entirely by that society. In the United States we have long since learned to follow the advice of Ruskin:

"Gain all the knowledge you can;
Then use it for the highest purpose."

THURSDAY, August 8th.

9.00 A.M.

International General Clinic—150 Clinicians.

Clinics will be given by members of the Canadian Dental Association, and by representatives of forty states and Alaska—Unit Clinics, Special Clinics on Root-canal and Crown and Bridge Work.

LUNCHEON.

Luncheon to Our Ex-presidents.

Former Presidents of the American, Southern, and National Associations to be the guests of the Association at a luncheon in their honor by the members of the profession, who desire in this small way to show their appreciation of the valuable services they have rendered the profession and also to pay a just tribute to the Founders and Builders of Organized Dentistry.

2.00 P.M.

Dedication of the G. V. Black Memorial.

It has now been almost three years since the dental profession was deeply grieved to hear of the death of Dr. G. V. Black. Those who were present at the Panama-Pacific Dental Congress at San Francisco will never forget, when his death was announced just at the opening of the Congress, how the cloud spread over that vast audience. In matters pertaining to dentistry, Dr. Black was easily the master. If the world misses him, as it surely does, how much more do we miss him? It was our pleasure and privilege to live with him, speak to him, and feel free to consult him at any and all times. By his death the dental profession has lost one of its most cherished members; the world has lost a benefactor. All that was needed to erect a monu-

ment to his memory was for someone to say the word. That word has been said, and dentists from nearly every state in the Union, as well as from many foreign countries, have contributed to the fund for the purpose. What could be more appropriate, therefore, than to unveil the monument to this great man when the National Dental Association is holding its annual meeting in the city where, during the last years of his life, he lived and worked.

8.00 P.M.

Patriotic Services.

Men of international and national reputation will be on the program for this unusual meeting, men who are the recognized leading statesmen, surgeons, and divines of this age. It is quite fitting in this great war crisis that the dental profession should show its patriotic spirit by pledging anew its loyalty and devotion to our country. The speakers on this occasion will give the members of the dental profession an opportunity to hear the best men of the day discuss the vital problems that have to do with the present and future of our Republic.

FRIDAY, August 9th.

9.00 A.M.

General Session and Section Meetings.

The Sections on Operative Dentistry, Materia Medica and Therapeutics, Organization, Mouth Hygiene and Public Service, Research, and the House of Delegates and the last general session will be the climax of this great meeting—an anniversary meeting that will go down through the years as having established a NEW HIGH-WATER MARK in the history of dentistry.

REMEMBER THE SPLENDID TIME YOU HAD IN CHICAGO at the fifteenth anniversary celebration of the Chicago Odontographic Society in 1903, and the Golden Anniversary of the Illinois State Dental Society in 1914. Since these meetings several years have elapsed, and the Chicago dentists have profited by being hosts on these occasions. They now ask that they be given another opportunity to prove the foregoing assertion.

The Chicago Meetings.

THE following associations gather at Chicago at the time of the N. D. A. meeting:

NATIONAL DENTAL ASSOCIATION. Chicago. August 5th to 9th.

CANADIAN DENTAL ASSOCIATION. Chicago. August 5th to 9th.

NATIONAL ASSOCIATION OF DENTAL FACULTIES. Chicago. August 2d and 3d.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS. Chicago. August 5th and 6th.

AMERICAN ACADEMY OF ORAL PROPHYLAXIS AND PERIODONTOLOGY. Chicago. August 2d and 3d.

AMERICAN SOCIETY OF ORTHODONTISTS. Chicago. August 1st to 3d.

ASSOCIATION OF MILITARY DENTAL SURGEONS. Chicago. August 7th.

DELTA SIGMA DELTA FRATERNITY. Chicago. August 5th.

PSI OMEGA FRATERNITY—NATIONAL ALUMNI CHAPTER. Chicago. August 5th.

XI PSI PHI FRATERNITY. Chicago.

[AT CHICAGO.]

Canadian Dental Association.

THE Canadian Dental Association has accepted the very kind invitation of the National Dental Association to meet with them in Chicago, August 5 to 9, 1918.

SYDNEY W. BRADLEY, *Sec'y.*

[AT CHICAGO.]

American Academy of Oral Prophylaxis and Periodontology.

THE fifth annual meeting of the American Academy of Oral Prophylaxis and Periodontology will be held August 2 and 3, 1918, at Edgewater Beach Hotel, Chicago, Ill.

GRACE ROGERS SPALDING, *Sec'y.*

[AT CHICAGO.]

American Society of Orthodontists.

THE eighteenth annual meeting of this society will be held August 1, 2, and 3, 1918, at the Edgewater Beach Hotel, Chicago, Ill.

This will be an excellent meeting. It is advisable to make your reservations early.

F. M. CASTO, *Sec'y,*
Rose Bldg., Cleveland, Ohio.

[At Chicago.]

National Association of Dental Examiners.

The next meeting of the National Association of Dental Examiners will be held in Chicago, Ill., August 5 and 6, 1918, at the Auditorium Hotel.

For further information address

J. A. West, *Sec'y*,
417 Utica Bldg., Des Moines, Iowa.

[At Chicago.]

National Association of Dental Faculties.

The next annual meeting of the National Association of Dental Faculties will be held in the Green Room of the Congress Hotel. Chicago, Ill., August 2, 1918, at noon. The Executive Committee will meet at 10 a.m. on the 2d. The meeting will continue through August 3d.

Chas. C. Allen, *Sec'y*,
N. W. cor. 10th and Troost, Kansas City, Mo.

[At Chicago.]

Delta Sigma Delta Fraternity.

The thirty-fourth annual meeting of the Supreme Chapter of Delta Sigma Delta Fraternity will be held in the Florentine Room of the Congress Hotel, Chicago, on Monday, August 5, 1918, at 9 a.m.

Headquarters of the Fraternity will be at the same hotel, where the annual banquet will also be held in the evening in the Gold Room. (Notify Dinner Committee *at once.*)

By order of the Supreme Chapter.

Hy. W. Morgan, *Supreme Gr. Master.*
R. Hamill D. Swing, *Supreme Scribe.*

[At Chicago.]

Psi Omega Fraternity.

The National Alumni Chapter of the Psi Omega Fraternity has established headquarters during the National Dental Association meeting at Room 230, Auditorium Hotel.

The business session of the National Alumni Chapter will be held in the New Ballroom of the Auditorium Hotel, Monday, August 5th, at 2.00 p.m.

The Psi Omega banquet will be held in the Florentine Room of the Congress Hotel at 7.00 p.m., Monday, August 5th.

Psi Omegas who expect to attend the banquet should communicate at once with Dr. M. M. Printz, 4235 Lake Park ave., Chicago.

Harvard-Tufts Training School for Dental Hygienists.

The commencement exercises of the Harvard-Tufts Training-school for Dental Hygienists were held at the Hotel Thorndike, Boston, Mass., on June 21, 1918.

The program included a dinner, after which addresses were made by Dr. H. C. Bumpus, president of Tufts College, Dr. George H. Wright, Dr. Wm. Rice, dean of Tufts College Dental School, Dr. Henry H. Piper, all members of the administrative board of the school: Dr. Leila M. Taylor, director of the school, and Miss B. L. MacFarland, representing the graduating class.

Dr. Eugene H. Smith, dean of Harvard Dental School and chairman of the administrative board, presided, and awarded the certificates.

Leila M. Taylor, *Sec'y.*

Forsyth Training School for Dental Hygienists.

Alumnæ Association.

The Alumnæ Association of the Forsyth Training-school for Dental Hygienists held its fourth meeting at the Forsyth Dental Infirmary for Children on June 20th. The Forsyth Alumnæ were glad to have present the graduating class of the Tufts-Harvard Training-school for Dental Hygienists, with their supervisor, Dr. Taylor. Some Fones Training-school graduates practicing in Boston dental offices were also present, and many undergraduate dental hygienists of the Forsyth School, with their supervisor, Dr. Anna V. Hughes. Two very interesting speeches were delivered. One was given by Dr. Carl Lindstrom of the Massachusetts State Board of Dental Examiners, on "The Success of Dental Hygienists." Dr. Albert L. Midgley of Providence spoke on "The Ideal Dental Hygienist." After the meeting a social hour was enjoyed.

A. E. Christie, *Editor,*
Class of 1917.

G. B. Winter Exodontia Club.

THE exodontists of Minneapolis and St. Paul had their first formal meeting at the Minneapolis Athletic Club, May 19, 1918. The guest of honor was Dr. George B. Winter of St. Louis, the originator of a new technique for the removal of impacted lower third molars. Dr. Winter demonstrated the efficiency of his system by removing a large number of impactions, at a clinic.

As recognition of his contributions to science, the club honored him by naming this, the first organization of its kind, for him.

HENRY B. CLARK, *President.*
CARL J. RICE, *Secretary.*

Iowa Board of Examiners.

THE next meeting of the Iowa State Board of Dental Examiners for the examination of applicants will be held in Iowa City, August 26, 1918, commencing at 9 A.M.

For further information address

J. A. WEST, *Sec'y,*
417 Utica Bldg., Des Moines, Iowa.

UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING MAY 1918.

May 7.

No. 1,264,997, to JAMES D. L. TENCH. Dental investment compound.

No. 1,265,022, to DANIEL A. ZURBRIGG. Method of forming and applying tooth facings.

No. 1,265,252, to FRANK H. RUSSELL. Artificial tooth.

No. 1,265,536, to GABRIEL SHARPS. Rotary toothbrush.

No. 1,265,581, to DANIEL A. ZURBRIGG. Matrix for use in tooth restoration.

No. 1,265,664, to JAMES W. IVORY. Dental multiple-jaw cervix-clamp.

No. 121,548, to B. L. DIEFFENBACHER. Trademark for dental cream.

May 14.

No. 1,265,898, to ROBERT M. FIGG. Gold-catching dental cuspidor attachment.

No. 1,265,910, to JAY A. HEIDBRINK. Apparatus for delivering a mixture of gases.

No. 1,266,382, to HUGH A. BAILEY and GLENN M. BAILEY. Toothbrush case.

No. 1,266,413, to ARMISTEAD C. CRUMP. Paste tube.

No. 1,266,465, to ARTHUR H. HILL. Folding toothbrush.

No. 121,604, to CALYPTO CO. Trade-mark for medicated dental cream.

May 21.

No. 1,266,659, to SAMUEL F. BRANNAN. Illuminating tooth clamp.

No. 1,267,039, to CLAUD O. AKIN. Dental implement.

No. 1,267,339, to MALCOLM M. MAUPIN. Means for securing artificial teeth to dental plates or the like.

May 28.

No. 1,267,442, to WM. M. MUCHOW. Artificial tooth.

No. 1,267,629, to HERMAN E. S. CHAYES. Dental drill.

No. 1,267,861, to THOMAS F. GLENN. Artificial tooth.

No. 121,822, to PYROTAL CHEMICAL CO. Trademark for dental cream.

THE G. V. BLACK MEMORIAL.

Monument unveiled at Chicago, August 8, 1918, at the annual meeting of the National Dental Association.

THE

DENTAL COSMOS

VOL. LX. SEPTEMBER 1918. No. 9

ORIGINAL COMMUNICATIONS

The Pathogenesis and Prophylaxis of Pyorrhea Alveolaris.

By Dr. MAURICE ROY, Paris, France,

PROFESSOR IN THE DENTAL SCHOOL OF PARIS; DENTIST TO THE HOSPITALS OF PARIS.

(Report presented to Section III, Dental Surgery and Therapeutics, of the Sixth International Dental Congress, London, 1914.)

(*Continued from page 670.*)

(II.)

Part II.

CHAPTER I.

THE ALVEOLAR LESIONS.

WITH the exception of the alveolar lesions, I have reviewed all the lesions which accompany the development of pyorrhea alveolaris. I have indicated the reasons for them. None of them, it appears to me, should be considered as the initial lesion which marks the first step in the development of the disease.

It remains to me only to examine the lesions of the osseous tissue, and, supported by clinical observations corroborated by morbid anatomy, to show that in fact the alveolar lesions antedate all others, and that it is their presence which permits the further evolution of the pyorrhea, with its habitual symptomatic *cortège* and its complex lesions. This subject will form the second part of my work.

(1) *Clinical lesions.* To study pyorrhea in its initial stage, let us consider the relations of the different tissues of the alveolar dental region in normal man. For this purpose let us consider the mouth of an individual, twenty years of age, healthy, having teeth well arranged, and whose teeth and gums are sound.

If we examine the gingival region of such a subject, we notice that the gum is inserted exactly at the neck of the tooth, where it presents a very minute pad, which forms a space V-shaped in form—a sort of groove, rather than a cavity—which Mendel Joseph calls the

pericervical space ("gingival trough" of Hopewell-Smith). If we attempt to explore the proximal interdental spaces we shall see that even with the finest instruments we penetrate only with difficulty between the teeth, and there will always be a slight tearing of the gum; for normally this space is completely occupied by the alveolar tissues, ligaments, and gums. This person has little difficulty in cleaning his teeth. They clean themselves spontaneously by mastication, by virtue of the perfect anatomical relations of the dental arches with the cheeks, the lips, and the tongue, which rub against the teeth throughout almost the whole extent of their vestibular and lingual surfaces. He does not experience the least need of using a toothpick, for no food débris will remain in his absolutely closed interdental spaces.

Let us now examine this same individual at the age of forty years. Let us suppose that his constitution is slightly arthritic. He has taken suitable hygienic care of his mouth. His teeth and gums are always healthy. His teeth are always perfectly placed upon the alveolar arches, and normally occlude. Nevertheless, if we ask him he will tell us that at times he has to make use of the toothpick, because after meals it frequently happens that food débris remains between his teeth. If we explore these interdental spaces, we find that while, twenty years previously, access into these spaces was very difficult, we can now pass into them easily and with instruments of very large caliber.* We likewise find in the vestibular and lingual regions of the mouth that the normal necks of the teeth are no longer in relation with the insertion of the fibro-mucous gum, and that the cementum is more or less uncovered.

Nevertheless—and I have assumed that our subject has followed the most efficacious hygienic precepts—the pericervical space has followed the gum in its recession, and has not been transformed into a pocket. There is no suppuration at the necks of the teeth.

We have here, however, a patient attacked by pyorrhea alveolaris (understanding this term always in a general sense as we have agreed to use it), since he exhibits the primary lesion of pyorrhea, viz, alveolar resorption. And if the patient were delinquent in the hygienic care of his mouth, if he had some trouble in what Godon has very justly called the articular equilibrium of the teeth, he would present, in the region of one or more teeth, no longer the clinical picture we have outlined, but that of pyorrhea clearly established, with the more or less deep gingival pocket which is characteristic of the disease, and with the complex symptomatic sequence which accompanies the evolution of this affection. What, then, has occurred in this individual, whose tissues are normal in external appearance, and in whom no local pathological cause has appeared to intervene?

If we examined the maxilla of this man by dissection, or if, more happily for him, we contented ourselves with making a radiograph, we should find that the alveolar borders have become notably lowered in height and present the lesions which J. F. Colyer has so well shown upon dried specimens, and presents in his work upon the "Pathological Anatomy of Periodontal Diseases."* If we made a section of the alveolar region of this same person, we should find there, in spite of his age, all the signs of senile alveolar atrophy, well described by Hopewell-Smith.†

* Simply because the abuse of the toothpick can produce lesions of the gum and of the ligament of the interdental space, it is not fair to assume, as many practitioners do, that the toothpick is responsible for the creation of interproximal gaps. These are produced spontaneously, and, in the large majority of cases, people begin to use toothpicks only when they feel the need as a consequence of the existence of abnormal interdental spaces, either through alveolar resorption, common in the case under consideration, or through caries, defective filling, or deviation of teeth from their normal positions.

* J. F. Colyer, *Ash's Monthly*, September 1913, p. 705.

† Hopewell-Smith, "Pyorrhea Alveolaris," Dental Cosmos, 1911, pp. 397 and 981.

This osseous atrophy is the primary lesion, entailing the resorption of the pericementum of the gum and the sequent denudation of the root of the tooth. The osseous lesions, in a word, have brought on all the others.

In order to demonstrate the exactness of the subordination of the modifications of the alveolo-dental ligament and of the gum to the osseous modifications, and supporting my argument by clinical findings, I shall take the example of a process diametrically opposite to that which I have just described, and in which the same sequence of phenomena is produced, but in an inverse order.

Teeth deprived of their antagonists present most often a vertical displacement, which is accompanied by loosening, and frequently by pyorrhea alveolaris. Yet individuals are at times observed in whom the absence of antagonists, if it has led to the vertical displacement of the teeth of the opposed jaw, has produced no loosening of the teeth, which are extremely firm in their alveoli and without any noticeable trace of denudation.

While the displacements observed in teeth deprived of their antagonists are ordinarily accompanied by a more or less considerable denudation of the root, which is in some degree forced from its socket, it may be established in these cases I have just mentioned that the root is only slightly or not at all denuded, and that the gingival mucosa is precisely adapted to the necks of the teeth, without trace of recession or of a pathological pocket—and this although the teeth may be considerably displaced, sometimes to such a point that they impinge upon and abrade the gum of the opposite jaw.

The alveolar walls are not resorbed, but, on the contrary, are thickened—as palpation of the region, and even at times direct vision, will show. If such a tooth be extracted, one learns that its resistance is always greater than that of its normally placed neighbors, by virtue of the greater resistance of its thickened alveolar walls.

There has, therefore, occurred here an inverse phenomenon to that which accompanies pyorrhea. Without the influence of causes which we are not called upon to investigate here, and which elsewhere I have tried to explain,* the osseous tissue has hypertrophied, and under this influence the tooth is vertically displaced, and with it the tissues whose framework is the bone, *i.e.* the pericementum and the gum.

Here is a very clear example of the subordination of pericemental and gingival modifications to osseous modifications, and in this fact I believe we find a confirmation of the primordial rôle played by the primary osseous atrophy of pyorrhea upon the pericementum and the gum, which follow their bony framework in its atrophic or hypertrophic evolution.

(2) *The anatomico-pathological lesions.* The truth of the location of the initial lesions in the alveolus and of the subordination of all other lesions to those of the osseous tissue, is not only furnished by the clinical data, but, if we control the clinical data by those supplied by pathological anatomy, we shall find confirmation of the considerations we have just adduced.

Indeed, if we examine numerous sections of cases of pyorrhea at different stages, as presented in the works of Hopewell-Smith (Dental Cosmos, 1911, p. 397), and those of Mendel Joseph (*l'Odontologie,* 1913, vol. ii, p. 49), and particularly those of the least advanced cases of the disease, we find that the osseous alterations always have progressed much farther than the gingival lesions; and we clearly see that the bone is already absorbed, while the gum and ligament are still attached to the cementum at a point near the neck of the tooth, and are, as yet, only slightly inflamed.

Hopewell-Smith† describes the osseous lesions thus:

---

* Maurice Roy, "De l'Allongement des Dents dépourvues d'antagonistes," compte rendu de Congrès dentaire national de Bordeaux, 1895, p. 126.

† Hopewell-Smith, Dental Cosmos, 1911, vol. liii, p. 405.

The alveolar bone exhibits, even before the gum, the most important metamorphoses that have occurred. Briefly, they are those produced by the process of halisteresis (perhaps a form of osteomalacia). Not only is the free margin of the bony socket absorbed by osteoclasts near the upper and lower parts of the cervical regions of the teeth, but deep down, by the radicular portion, giving the surface an eroded appearance; moreover, there is also a decalcification of the most superficial portions. The bone becomes transformed into an osteoid tissue through loss of its calcium salts, then passes into an intervening fibrous tissue, and finally is attacked by the inflammatory exudation and cells, its bays and recesses becoming meanwhile greatly enlarged and filled with loose soft tissue, and the Haversian canals enlarged and irregular, the condition being termed osteoporosis.

The osseous lesions, indeed, are not confined to the alveolar borders. Equally well may be recognized a process of osseous absorption in the apical region; but, by virtue of the anatomical relations of the region, it is the resorption of the alveolar borders which, breaking the gingival insertion at the neck, will condition the development of the symptomatic ensemble termed pyorrhea alveolaris.

If the lesions of the alveolo-dental ligament preceded those of the alveolar septa, and were the cause of their resorption, this could only be brought about as a result of an inflammatory process, which may possibly exist when the pyorrhea is definitely established, but which is lacking at the initial period, as we have just shown. The osseous lesions would be less advanced than the gingival and pericemental lesions, which is never the case in the preparations which we have referred to, and which constitute the most recent and complete histological studies we have upon pyorrhea.

Mendel Joseph,* although he does not formally specify the primary lesion of pyorrhea, says:

The alveolo-dental ligament represents the anatomical center around which the pyorrhetic lesions develop, but it does not appear to be the pathological center. In the majority of preparations which I have examined, the alterations of which it is the subject have appeared secondary to the lesions of the adjacent tissues.

If this author considers certain osseous lesions as secondary, it also means that in certain cases examined by him, on the contrary, they appeared clearly primary: "The gingival lesions can no longer be invoked as the initial factor, for they are scarcely marked, and nevertheless the alveolar walls are the victim of a work of profound rarefaction."*

In connection with a recent paper read before the Odontological Society of Paris, he presented several still unpubished sections, and, apropos of one of them, said that while he expected to find pyorrhea at its very beginning, he had been surprised to find that the osseous lesions were much farther advanced than the peripheral lesions had indicated.

Hopewell-Smith† clearly confirms this phenomenon, and concludes his work with the statement that pyorrhea "depends essentially upon an osseous lesion, upon a bony atrophy." This idea appears, indeed, to result from the ensemble of the preparations of this learned observer.

CHAPTER II.

PRECOCIOUS SENILITY.

The osseous changes just described are the result of a precocious senility. Hopewell-Smith arrived at this conclusion, and I am absolutely in accord with him upon this point.

This idea of the precocious senility of the alveolo-dental tissues was first expressed, I believe, by an Englishman, Thomas Bell,‡ in 1835, and was taken

* Mendel Joseph, *l'Odontologie*, 1913, p. 69.

* *Ibid.*, p. 68.

† Hopewell-Smith, DENTAL COSMOS, 1911, p. 410.

‡ "A considerable absorption of the gum and of the alveolar process, provoking the denudation of a large part of the roots of the teeth, is sometimes produced without the accompaniment of any appearance of disease, and without any serious organic trouble. In forming an opinion upon cases of this sort and of those in which the loss of substance is

up in 1892, in France, by Paul Dubois. Likewise, this opinion is defended in America by Talbot, and in Germany by Robert Baume. If these several authors are not in accord in regard to the seat of the primary lesion, they are unanimous at least upon one point, namely, that precocious senility causes pyorrhea alveolaris. This conception of precocious senility as the cause of pyorrhea is to me of great interest, for it implies, in itself, outside of the primary local lesions, the intervention of a general factor, whose influence is primordial.

The clinical picture which I have traced of an individual examined at twenty years of age, and again at forty, will be confirmed, I am sure, by all practitioners who have practiced sufficiently long to have been able to follow attentively the same individuals throughout many years. Now, the anatomical modifications which are produced in the person whom I have taken as an example are evidently not due to local, but to general causes. They are associated with the vitality, the general nutrition, of the individual.

Alveolar resorption is not alone a consequence of pathological troubles, but it is also the result of a pathological process. Hopewell-Smith* says:

> Absorption of each alveolar process of the jaws is a common occurrence; it is the rule in man and the lower animals. The more aged the individual the greater the loss of this bone, with the concomitant shedding of its dental occupants. The teeth of dogs, cats, monkeys, and other animals, either in a domesticated environment or *in natura fera*, become loose as time passes by, as a direct consequence of the absorption of their sockets —a physiological process. Man becomes more and more inclined to be edentulous as he advances in life—a part of the decadence of his vital powers. Thousands of skulls of aged people exist where the teeth remain *in situ*. This is due to the splendid natural physique of the owners. But in probably eighty per cent. of individuals living in highly civilized communities it is the normal condition for the alveolar processes to atrophy and shrink, for the gum tissues to become thinner and degenerate, and for the roots of the teeth to become exposed.

Senile atrophy of the alveolar borders is, then, a physiological process when it occurs at an advanced age; but, according to R. H. Hofheinz (Dental Cosmos, 1913, vol. lv, p. 630), senility is not necessarily a question of years. Some persons are old at thirty, if judged by their teeth; and Paul Dubois has already emphasized the fact, which I believe has not been sufficiently emphasized, *e.g.* "In a number of people affected by expulsive periodontitis, there is a precocious atrophy of the hair follicles. The hairs become white, and are soon lost."

As regards this I have been curious, but hitherto have not collected a sufficiently large number of observations. In some individuals the teeth first at-

---

associated with a more or less morbid state, it is necessary to recall that teeth disappear in old age generally in an identical fashion, *i.e.* the destruction of their support by absorption of the gums and of the alveolar process. And, as this first step toward a general decay commences at different periods, according to temperament, it can surely, in many cases, even among persons not beyond middle age, be considered as a sort of precocious senility or senile decay—at least, as regards these parts of the body. However, it is not always necessary to hold it (old age) responsible; for sometimes senile decay is met with in young subjects, and assuredly it proceeds from the same causes as those which are considered responsible for a similar loss of substance in these parts when they are accompanied by a more or less morbid state. These differences can, perhaps, be attributed to the difference of constitution, or to the greater or less period which has elapsed since the primary cause of the affection, whatever it might have been, supervened. Although the gradual loss of gum and alveolar substance occurs occasionally without any serious local or constitutional morbid action, it occurs more frequently by derangement of the digestive organs or some other immediate or remote constitutional cause; and then it is invariably accompanied by a morbid condition of these same parts." (Th. Bell, "The Anatomy, Physiology, and Diseases of the Teeth," 2d. ed., London, 1835, p. 211.)

* Hopewell-Smith, Dental Cosmos, 1911, vol. liii, p. 989.

tacked by senile alveolar absorption are those situated on the same side as that on which the hair first became "precociously gray."

If, as Hopewell-Smith says, halisteresis is the primary process of osseous resorption, this fact would furnish the explanation of the pathological relation, suggested by Paul Dubois, between the bleaching and falling out of the hair and pyorrhea alveolaris, since halisteresis seems rather to be due to the action of the nervous system,* and since nervous inter-relations between the teeth and hair are known—inter-relations upon which Jaquet, in France, has particularly insisted in treating of the etiology of alopecia areata.

But, whatever be these accessory phenomena, there exists, as was very clearly shown from the preparations of Hopewell-Smith, a formal identity between the senile resorption of the alveolar borders and the osseous resorption of pyorrhea at its beginning. Doubtless, when cases of further advanced pyorrhea are examined, phenomena different from those of senile atrophy are found; but at this stage other causes have intervened in addition to the primary process. This is why I must continue to insist that in order to discuss the nature and origin of pyorrhea, one must refer to the cases in the initial period of the disease, and not to cases where the disease is already advanced—for too many accessory causes then appear which will mask the primary lesions.

The objection made to the nature of the senile atrophy of the bone in pyorrhea is that certain osseous lesions observed are of an inflammatory nature, and not atrophic; but this condition explains itself, since to the primary phenomenon, purely atrophic in the beginning, are added later, as we shall see, other secondary phenomena which affect the gum and the pericementum, and which, being inflammatory in nature, provoke in the underlying bone phenomena analogous to those which are observed in all inflammations occurring under similar conditions.

In simple gingivitis, for example, alveolar resorption can be observed; yet this feature has no claim to figure in the category of what is called "pyorrhea alveolaris." It is simply a resorption by inflammatory propagation of a common process, and this feature does not constitute a clearly determined disease such as that we are accustomed to consider under the name of pyorrhea alveolaris. It is precisely from this confusion of cases which are not similar that some of the errors arise concerning the nature of pyorrhea.

From the considerations I have just adduced it results that if one desires to study pyorrhea alveolaris in its earliest phases, and in cases where it exists uncomplicated, *i.e.* without association with any accessory process, the findings of the clinic and of pathological anatomy are united in affirming that *Precocious senile alveolar atrophy is the initial lesion of pyorrhea, constant in occurrence, and preceding all other lesions.*

To what cause may be attributed this precocious senile alveolar atrophy? I do not intend to discuss this subject at length; that would exceed the limits I have assigned myself. It might be developed as a separate thesis, the elements of which would be found in the already mentioned interesting study of Julien Tellier, in which is contained a synopsis of the general causes invoked as provocative causes of pyorrhea.

I can say, however, that it seems probable that a large number of causes can intervene to call forth this precocious senility, and that all diatheses can doubtless lead to it. Arthritism, in particular, by virtue of its accompanying circulatory disturbances and of the vasomotor and trophic phenomena it provokes, is quite naturally the diathetic condition which is most frequently the cause of this precocious senile atrophy, and consequently of pyorrhea alveolaris.

This atrophy could be due to vasoconstrictor phenomena, which would manifest themselves more particularly in terminal points, as the alveolar borders, which according to Talbot are adventitious and transitory organs. This

* Julien Tellier, *loc. cit.*, p. 97.

is why, contrary to Endelman's opinion, pyorrhea improves not by rest, but by the re-establishment of normal mastication, this favoring the circulation of the alveolo-dental articulation.*

From the fact that pyorrhea alveolaris is an affection resulting from a primary general cause, there arises an important point, namely, that the suppression of local causes, whose considerable rôle in the evolution of the disease I shall immediately show, is unable alone to arrest this disease. Indeed, if alveolar resorption due to the extension of a gingival inflammation by calcareous deposits is *completely* arrested after disappearance of the tartar and the gingival inflammation thereby induced, and if this resorption is not resumed, while the local conditions remain satisfactory, the disease is not pyorrhea. *In the exclusion of every local adjuvant cause this affection is slowly progressive, while there exist the general causes which provoke precocious senile alveolar resorption.*

CHAPTER III.

THE EVOLUTION OF PYORRHEA ALVEOLARIS.

Precocious senile alveolar resorption constitutes the first phase of pyorrhea alveolaris. However, if this disease remained at this first stage, it would never have earned the name of pyorrhea. We must now see in what order the phenomena following this resorption succeed each other, and the rôle played by the various etiological factors wrongly cited as primary causes, but which are the adjuvant causes so important in the development of the disease.

I have said that the initial alveolar resorption brings in its train the corresponding resorption of the pericementum and of the gum. If the gingival resorption makes parallel progress with the osseous resorption, the accidents are limited to the denudation of the tooth root. The gingival fibromucosa remains firmly inserted in the cementum at a plane more or less distant from the normal neck, but there is no suppuration at the neck, and no gingival pocket except the normal pericervical groove (gingival trough, Hopewell-Smith). *There is no noticeable loosening of the teeth, even when the radicular denudation is very extended, if there is no pocket formed.*

All disturbances of articular equilibrium of the teeth, malocclusion, malposition, absence of approximal or antagonistic teeth, will favor the production of precocious senile alveolar resorption; for already, indeed, these have by themselves created abnormal relations between the gingival insertion and the necks of the teeth, except in the unusual cases above cited.

This is why pyorrhea begins sooner in regard to teeth affected by these disturbances of equilibrium, though these, of themselves, could not call forth the disease; for in certain individuals refractory to pyorrhea, disturbances of dental equilibrium are encountered with no sign of pyorrhea, even after they have passed middle life—by virtue of the absence of alveolar resorption from general causes indispensable for the beginning of the disease.

As long as there is a parallelism between alveolar resorption and gingival resorption, no pocket is produced at the neck of the tooth. However, this parallelism may be destroyed. And accord-

* This would justify the very interesting remark of Wheeler, who, having examined a large number of ancient crania and not having found any indication of pyorrhea, and very slight indication of tartar, thinks that this is due to the more vigorous exercises practiced by man during mastication in primitive ages, which led to a greater vitality of the peridental tissues, and rendered them less susceptible to attacks by micro-organisms which have always existed in the mouth, without taking into account the fact that, at this period in the development of man, affections due to diminishing nutrition would be infinitely more rare, in consequence of the much greater physical activity of the race in primitive ages. (Wheeler, "Some Observations upon the Obscure Etiology of Pyorrhea Alveolaris," DENTAL COSMOS, 1906, vol. xlviii, p. 473.)

ing to the observation of R. Baume,* the bone may be more rapidly absorbed than the gum. To bring this about, it is sufficient that a marginal gingivitis be set up at any point of the neck. There results immediately a slight hypertrophy of the gingival pad, which increases the normal pericervical space. From a simple gingival trough, which is its normal state, it becomes a small pocket, in which organic débris of all sorts from the mouth collects, and serves as a culture medium for innumerable micro-organisms.

Under the shelter of this small pocket, calcareous deposits, originating from the saliva, and conditioned, perhaps, by the extravasated blood or pus, are deposited upon the denuded cementum, and increase, at the same time, both the causes of gingival irritation and the causes of infections.

Two new accessory elements of the disease, infection and calculi, have, then, intervened at this moment, and pyorrhea arrives at maturity, with the formation of the pocket at the neck, which will precipitate the development of the disease. Gingival inflammation is conveyed to the pericementum and to the alveolus, and phenomena of osseous resorption of an inflammatory nature are added to the phenomena of senile resorption, and augment the divergence from parallelism between osseous resorption and gingival resorption.

Indeed, if inflammation produces in the bone phenomena of resorption, the same does not hold good for the gum, which, on the contrary, is hypertrophied by the same process, and which, sustained by healthy or less affected portions which surround it, ceases to follow the alveolus in its process of resorption, which at the beginning was senile but is now inflammatory. The pocket deepens more and more, protecting the increasingly numerous micro-organisms, which there produce pus in abundance, and aggravate thus all the pathological phenomena previously existing, and upon whose progress I need not dwell, for they are now too well known to call for any discussion.

In this descriptive picture which I give of the disease, I have followed a methodical order, with the view to rendering more clear and more explicit the rôles, respectively, which I consider should be attributed, in the evolution of pyorrhea, to each of its etiological elements; but, for pyorrhea, as for the majority of other diseases, although this methodical evolution may be observed, yet it is often modified by accessory conditions which may mask the real conditions.

It is thus that gingivitis, which I have indicated as being consecutive to pyorrhea alveolaris, may exist previously to the development of pyorrhea; but that does not modify at all the reality of the succession of pathological phenomena which I have indicated. The only difference lies in the fact that in the picture which I have traced above, more or less time may elapse between the phenomena of alveolar resorption and the formation of the pocket, while, if gingivitis exists previously to alveolar resorption, the formation of the pocket will *immediately* follow the establishment of *precocious senile alveolar resorption.* And this is why a large number of observers, seeing only the previous gingivitis, attribute solely to this the formation of the gingival pocket, whose production, I think I have demonstrated, is a phenomenon preceded by much more complex and deeper causes than the simple local phenomenon which strikes the eye upon observing the established disease. These are exactly the deep causes which explain why a gingivitis may never be followed by pyorrhea in one individual who presents all local requisite conditions of infection, while the disease will occur in another individual who may present only slight infections and inflammatory conditions.

In gingivitis the essential factor of pyorrhea, precocious alveolar resorption, will be lacking, and this disease will not appear—even at times in aged individ-

* R. Baume, "Atrophie alvéolaire précoce et Pyorrhée alvéolaire," *Scheff's Handb. d. Zahnheilkunde,* 2d ed., vol. ii.

uals, who, if judged by their alveolar borders, will be found to be exceptionally young.

This also explains why such an individual, whose mouth is foul and whose gums have been inflamed for thirty or forty years without hitherto experiencing any apparent trouble in the vitality of his teeth or in their mechanical resistance, one day suddenly notices the appearance of a characteristic pyorrhea, because a precocious alveolar resorption, connected with some general constitutional trouble, has developed. At this moment, gingivitis, often existing from infancy, and hitherto having led to no profound trouble of the alveolo-dental articulations, becomes immediately associated with the precocious senile alveolar resorption, to produce mature pyorrhea with a rapidity varying with the degree of preparation of the infectious terrain.

As is seen in this portrayal, which accurately corresponds with clinical data, the different elements involved as causes of pyorrhea find their logical place in the evolution of the disease, and there is clearly seen, I think, the subordination of all other phenomena to precocious senile alveolar atrophy, the initial lesion. But in this complicated series, in which lesions may almost without interval be added one to another, and in some manner be confounded in a common evolution, it is not easy to establish the part assignable to each of the causal elements, while it is especially difficult to establish their sequence.

Therefore it is necessary to study pyorrhea at a sufficiently early period and in individuals in whom it is not yet associated with secondary phenomena which are but complications of the primary affection.

Part III.

CHAPTER I.

THE PROPHYLAXIS OF PYORRHEA ALVEOLARIS.

The majority of authors who have written upon pyorrhea all realize a part of the truth concerning the predisposing causes which at times play an apparently sufficiently important rôle to mask almost completely the initial cause. This condition is not strange, because it is incontestable that the treatment of these adjuvant causes (disturbance of articular equilibrium, gingivitis, etc.) has considerable influence upon the improvement of pyorrhea.

Indeed, once pyorrhea is made possible by the occurrence of its primary lesion, the precocious alveolar resorption would not pass on to the mature condition, that condition marking the serious state of the disease, if one of the local adjuvant causes did not intervene. This is why, although this disease be traceable to a general cause, the efforts directed against local, adjuvant causes have such an influence in prophylaxis.

(1) *General causes.* To combat the general causes is a delicate task, variable according to the different systemic conditions likely to provoke precocious alveolar absorption, and in this treatment the dentist will often be a useful collaborator with the medical practitioner, if only to recognize the appearance of this pathological phenomenon indicative of a particular diathetic state.

I cannot here elaborate upon this general treatment, which obviously will vary with the cause provoking alveolar resorption. This treatment has great importance, as much from the standpoint of general as of local health, since we have shown that pyorrhea is gradually progressive, while there exist general causes provoking precocious senile alveolar resorption.

But this general treatment is important, and if it is not to be neglected it is necessary to recognize thoroughly that in the actual state of our knowledge it can exert only a restraining and remote influence upon lesions, once they have arisen. On the contrary, with the proscription of all the adjuvant causes of pyorrhea, local treatment entirely in the hands of the dentist will have the happiest effects upon the evolution of the disease, either by preventing its arrival at maturity, or, if that has occurred, by causing the disappearance of the secondary elements and by re-establishing the

health and functioning of the tooth as far as the stage of destruction of the tissues permits.

(2) *Local causes.* The gravity of pyorrhea in its mature form is known. The dentist should, therefore, apply himself most energetically to the prophylaxis of the local causes. In this respect his rôle is a responsible one, and regretfully he must confess that he most often neglects it, because through ignorance of the true pathogenesis he is not able to prescribe to his patients preventive hygienic measures, nor to indicate means of avoiding the development of this disease, dreaded for its local consequences.

This last point I would develop in closing, for it is the logical conclusion from pathogenic deductions which I have elaborated perhaps a little too tediously, but whose importance from the prophylactic viewpoint appears to me such that I insist upon it with all the ardor of a conviction based upon minute observation in a large number of patients.

The result of the considerations I have just developed is to teach that prophylaxis should be directed to two objects; namely, particularly to combat traumatic causes, but also to combat gingivitis and the infection which it represents.

I shall not expatiate upon the prophylaxis of traumatic causes, as this is a phase of the subject on which all authors are in accord. I shall confine myself to saying that the dentist should direct his efforts toward the elimination of all causes leading to a disturbance of the articular equilibrium of the teeth and favoring precocious alveolar resorption.

Such care should be exercised not only at the period when patients are particularly susceptible to the disease on account of their age, but also (and even more emphatically) from youth on, while correcting dental malpositions and conserving the dental organs.

It should never be forgotten that the loss of a single tooth in youth, although it may not cause any great apparent inconvenience during twenty or thirty years, may be, at a given moment, the provocative cause of the development of a pyorrhea which will occasion successively the loss of all the teeth in the mouth if the appropriate treatment, often long and difficult, is not applied. Particular attention should be given to the insertion of fillings, which should always restore the forms of the teeth, and, above all, to maintaining their approximal contact. Attention to all these precautions will result, as we have seen, in the removal of the causes favoring alveolar resorption.

All dentists are in accord as to the importance of the hygienic care of the mouth as a means of avoiding infections and gingivitis, but because of a misunderstanding of the real mechanism by which pyorrhea develops, they do not give sufficient attention to certain particular points which are the cause of the development of this affection among persons who regularly brush their teeth, and in whom, even though resorption from a constitutional cause cannot be avoided, pyorrhea should never reach its mature form.

(3) *How does pyorrhea develop notwithstanding the fact that patients brush their teeth?* To make myself better understood, I shall refer to the clinical example which I took in the course of my description. It is the hypothetical case of an individual having all his teeth, healthy, normally arranged, and well supported.

At his twentieth year we examined him. His gingival attachments were perfect; and, even with very fine instruments, we could not pass into the interdental spaces, which were entirely filled by the normal gingival pads, without a slight tearing of the tissues.

At his fortieth year we re-examine this same patient, who is slightly arthritic, but whose teeth have always been healthy and normally placed. We notice then that he is led to make use of a toothpick, because food débris remains in his interdental spaces after eating; and while twenty years previously we passed only with difficulty between the teeth, we notice now that relatively large

instruments easily pass into the interdental spaces. Likewise we notice that the normal necks of the teeth are no longer in relation with the attachment of the gingival fibromucosa, and that the cementum is exposed to some extent, but no gingival pocket exists.

We have said that this patient was affected by pyorrhea alveolaris in its first stage, since he presented precocious senile alveolar resorption. Let us now see how this pyorrhea will evolve toward maturity; and this clinical picture will be, I think, the best illustration from which to develop the prophylaxis of the disease.

We have taken as an example an individual brushing his teeth regularly. If, then, at forty years, the mouth being in the state we have described, he continues to brush regularly the *gingival necks* of the teeth with the same care as previously there will result no grave inconvenience from this alveolo-gingival resorption; the tooth will maintain its almost normal solidarity, even with quite extended resorption; the uninflamed gum will remain firmly attached to the new neck of the tooth, and there will be no suppuration.

But at this period these hygienic conditions are difficult to maintain, for many reasons: (1) The cementum of the tooth is often slightly sensitive, especially if the patient continues to use a powder dentifrice; and this is one reason why his toothbrush instinctively does not pass over the denuded areas. (2) The new gingival neck is subjected to the cleansing effect produced by food attrition, and the friction of tongue, lips, and cheeks, less than is the normal neck. (3) This resorption being generally unknown to the patient, he continues at forty years brushing his teeth as he did at twenty; his brush, by an automatic movement, passes always at the same level, so that the normal neck of the tooth may still be brushed in a perfect manner (it may even produce, at this level, the so-called chemical erosion, from excess of brushing with powders), while at the new gingival neck, which escapes brushing, tartar and deposits of every sort collect, which will provoke gingivitis and the formation of gingival pockets by the mechanism which we have described.

It is thus that pyorrhea is definitely established, in spite of the brushing of the teeth three or four times a day.

(4) *Dental errors.* Yet it is necessary to say that in a large number of cases the dentist does nothing to correct these bad practices of his patient, which may lead to the loss of all the teeth. The dentist placidly assists in the development of a characteristic pyorrhea, which too often he believes himself powerless to prevent. He not only does nothing, but (and this is a graver error) he often does worse; for, as a result of a grievous diagnostic error, taking effect for cause, he gives to his patient advice which will aggravate the condition and precipitate the evolution of the disease.

Indeed, if the patient, remarking the denudation of the necks of his teeth, asks advice of his dentist, this phenomenon is often attributed to an excessive brushing of his teeth; and the advice given is to use soft bristles, sometimes as soft as those of a shaving-brush. The dentist advises brushing the teeth solely in a vertical direction, which distinctly fails to clean the pericervical groove—or precisely that part of the tooth which most needs cleaning.*

In substance, the dentist advises the patient to avoid brushing his gums, thus aggravating the condition of his patient, in whom pyorrhea will evolve now without hindrance.

This is exactly comparable to forbidding brushing the head to one losing his hair from senility, under the pretext that it is the brush which is making his hair fall out, thus allowing dirt to accumulate on the head—which will accelerate

* Indeed, in one direction the brush passes as a bridge above this gingival groove, and in the other direction it crowds organic débris therein, and thus favors the formation of a pocket. This manner of brushing, then, should not be employed to the exclusion of any other, especially since the interproximal spaces of the teeth may be perfectly cleaned by horizontal brushing with a stiff brush.

the loss that it was intended to prevent.

I would not, before such an eminent assembly, which includes the professional *élite* of the entire world, give the impression that I am championing puerilities upon such a subject as that I have chosen, but when one has to combat such an affection as pyorrhea, which develops in subtle and silent fashion, and which attracts attention only when it has reached an advanced stage, one must not fear to descend from the high summits to emphasize these small facts of daily practice and to show their sad effects upon the development of the disease.

When the lamented W. D. Miller, after observing for years the effect of brushing the teeth with different brushes and powders used by patients, showed the cause of the development of so-called chemical erosion, he did more to add to the knowledge and prophylaxis of this affection than was accomplished by all the microscopic researches made by him and others upon the subject.

The attentive observation of the facts, then, shows that as a result of these small causes the grave disorders of pyorrhea develop whose primary lesions I have indicated. The following aphorism may then be formulated: All dentists ought always to keep in mind that *Pyorrhetic pockets are formed around a tooth only when one point of the gingival neck of the tooth cannot be maintained in a satisfactory state of cleanliness.*

(5) *Advice to give to patients.* By the maintenance of cleanliness, as perfectly as possible, of the gingival necks of the teeth, the dentist will combat the development of pyorrhea. He will attain this result, not only by his operative procedures, but also by his surveillance over the teeth of his patients, and by judicious advice. He must arrange with them to pay him regular visits, when he can examine the necks of all the teeth. He must point out to them the most vulnerable places, and especially those which are insufficiently brushed, so that his patients can correct vicious habits of brushing too automatically. He must demonstrate to them the importance of brushing this *gingival neck,* which is modified by age or general constitution. He must show them that the toothbrush should always follow this neck as it ascends along the root as the result of this precocious senility. He must explain to them the nature of this precocious senility, which can be controlled only by general treatment, the effects of which can but slowly become manifest. He must show them that this general state of the constitution and of the mouth will have serious consequences for the teeth only if they neglect this cleanliness of the gingival neck; that the radicular denudation which they present is not a result of brushing the teeth, but quite the contrary, a result of the general disease. Finally the dentist must tell them that, the disease already existing, the sole danger resides in the absence of parallelism between osseous resorption and gingival resorption, and that it is necessary to become resigned to a slight denudation at the necks of the teeth, otherwise healthy and firm, rather than to have gums less resorbed, but with loose teeth, whose condition grows worse daily.

The majority of patients, however little care they give to their teeth, easily understand these explanations, realize their importance, and sincerely try to attain the goal which has been pointed out to them, because they have understood its motive and feel directly interested in its realization. The result will be a very rapid amelioration of the condition of the gums and the disappearance of the sensitiveness of the necks of the teeth (provided they do not use powder, paste, or soap); these improvements will demonstrate the excellence of a treatment for which they will not fail to be grateful to the dentist.

There is still one point to which it is proper to direct the attention of the patient, *i.e.* the condition of a pyorrhetic tooth grows worse, the less the force of mastication is exercised upon the tooth. Leaving out of account prosthetic restorations, which may at times be of advantage to pyorrhetics, it must be demonstrated to them that they

should not avoid biting upon a tooth because it is slightly sensitive as the result of very mild inflammation; that, upon slight insistence, they will find the sensitiveness disappear at the end of a few moments; mastication may thenceforth be performed without effort, and the nutrition of the alveolar tissues will be improved by this procedure in place of being lessened by the inactivity of the articulation.

In closing this article, I do not pretend to have solved the numerous problems of pyorrhea alveolaris; but I think I have accomplished my purpose, which was to bring some order and clarity into the contradictory phenomenal elements furnished by the works of my predecessors.

Supporting my contentions by the means most familiar to me, that of clinical observation, which I have shown to be in accord with the most recent work on pathological anatomy, I have sought to establish the relations of these diverse elements, and to present to you finally what I believe to be the logical and true evolution of the disease.

I consider that an exact conception of the development of pyorrhea is intimately associated with its prophylaxis. That is why I should be very happy if this communication should be a useful contribution to the study of this disease and to the battle against an affection which is the despair of the patient.

Conclusions.

(1) The term pyorrhea alveolaris is applied to a disease characterized, in its advanced period, by the presence of a more or less deep gingival pocket at the neck of the tooth, with corresponding denudation of the root over all that portion which comes into relation with the pocket.

(2) Pericemental abscesses upon vital teeth are not due to gouty tophus; these are pyorrhetic abscesses, formed in a serpiginous pocket, whose opening at the neck is unrecognized by virtue of its location, being situated at a point apart from the gingival abscess.

(3) The initial lesions of pyorrhea alveolaris can be determined only by the study of the disease at its initial period, *i.e.* at a time when they are not masked by other associated affections.

(4) Precocious senile alveolar resorption of the alveolus is the initial lesion of pyorrhea. It is constant, and precedes all others.

(5) This resorption is of an absolutely general origin, since it can occur independently of any local cause.

(6) All local causes, invoked as the cause of pyorrhea alveolaris, are only adjuvant causes, since they can exist without pyorrhea, and since this disease—notably at its initial period—can exist in their absence. This would be inadmissible if they played the rôle of primordial causes.

(7) In the absence of any local adjuvant cause, pyorrhea slowly progresses as long as the general causes exist which provoke precocious senile alveolar resorption.

(8) Pyorrhea is established by its primary lesion, precocious alveolar resorption; but it would not reach its advanced state, that which marks the serious period of the disease, if none of the local adjuvant causes intervened to complete the primary lesion.

(9) The prophylactic treatment of pyorrhea, leaving out of consideration any general treatment, will emphasize a disregard of all adjuvant causes (disturbance of articular equilibrium, infection, gingivitis, etc.).

(10) The normal functioning of the teeth affected with pyorrhea is an element favorable to their organic resistance. It should always be re-established, if it has been destroyed.

(11) The hygiene of pyorrhetics should always be inspired by this essential principle; that the pyorrhetic pockets are formed around a tooth only when any point of the gingival neck of this tooth cannot be kept in a satisfactory state of cleanliness.

(12) The dentist should, therefore, undertake the education of his patients, whose co-operation is indispensable in the prophylaxis of pyorrhea; and, by a regular surveillance, he should treat the slightest complications of the disease.

Conservation of Time in Teaching Dental Students.

By EUGENE S. TALBOT, M.D., D.D.S., Chicago, Ill.

CONSERVATION of time and money is the watchword in every department in these stirring war times. How to obtain the most out of the least expenditure of time and money is the crying need in every walk of life.

The art of ship-building, the manufacture of munitions of war, the production of food products for feeding the armies and the peoples of the world, have all been placed upon a scientific basis. The fully developed and equipped soldier ready for active service, which has required three or more years to produce in European countries, is now prepared in America in one year or less by intensive training. A prominent colonel in the United States army told me that one American soldier was as good in fighting qualities as five German soldiers.

At the present time the medical teachers throughout the country are engaged in formulating plans whereby the medical student and the trained nurse may be properly equipped to enter active service in the shortest possible time. The report of the Council on Medical Education,* under "Continuous Sessions in Medical Schools," is as follows:

At the conference held in February, the chairman of the Council, who is a member of the Surgeon-general's staff at Washington, presented a scheme for a continuous session in medical schools. The scheme outlined suggested that, for the duration of the war, each year be divided into three periods of four months each, these sessions beginning in October, February, and July of each year. It was shown that the student could enter on the study of medicine at the beginning of any one of these periods, and continue for eight successive periods of four months each, at which time he would graduate and enter upon an intern service of one calendar year. This would require just four calendar years, when he would be ready for active service with the army. It was argued that by the adoption of this or some similar scheme the summer periods heretofore looked on as a vacation time would be utilized; the extensive teaching plants would be kept in continuous operation, and students would be graduated from nine to twelve months earlier than under the methods heretofore prevailing. Under this scheme the present junior class would be graduated four months earlier; the present sophomore class would be graduated eight months earlier, and the present freshman class would be graduated a year earlier, than under the former method. It was argued also that since there would be no vacations for the boys in the trenches, or for the medical officers in the service, there appeared to be no reason why those remaining at home in the enlisted reserve corps or on the teaching staffs should not utilize the summer months to good advantage. The Council, however, is not unanimously in favor of the continuous session, since one member believes that the speed of production gained would not compensate for the loss of the thoroughness in teaching and the drain on the students' health. It is stated that at McGill and Toronto universities in Canada the system has been abandoned excepting for the last year students.

I have purposely quoted this report in full for future reference.

Prof. Arthur Dean Bevan, president of the American Medical Association, in his address,* says, in regard to the training of nurses:

One of the serious problems now confronting us is the securing of the necessary number of women nurses for our army and navy hospitals. We shall need from 25,000 to 40,000 women nurses. These cannot be secured from

* *Journ. Amer. Med. Association*, June 15, 1918, p. 1849.

* *Ibid.*, p. 1808.

the trained and registered nurses of the country and leave a sufficient number of nurses to care for our civilian population. It requires three years of training in times of peace to educate a nurse. But we must remember that in peace times it requires a four years' training at West Point and Annapolis to make an officer of the army or navy. In the emergency of this war we are developing splendid officers from well-educated, capable men taken from civil life, by intensive short three months' courses in our officers' training camps. The same plan should be adopted in securing the necessary nurses.

There are thousands of well-educated, capable young women in this country who are not only willing but anxious to offer their services to the country. Nurses' training camps and training schools can be developed in our army and navy cantonments, where, with an intensive three months' training, these young women can be developed into most useful war nurses, and meet the needs of the Government. The Surgeon-general of the army has already taken steps to encourage these nurses' training schools.

The report of the Council on Medical Education, because of the adverse opinion of one member, did not affect the views of Surgeon-general Gorgas. It will be observed on page 1950,* under the heading "Memorandum for the Surgeon-general of the United States Army," that he called a meeting of the Advisory Committee on Medical Schools on June 11th, and devised a plan by which the best medical schools in the country could carry out the views suggested in the report of the Council on Medical Education. It will be seen, therefore, that the most difficult situations may be overcome when there is a disposition to correct faulty methods or to improve old methods of teaching.

In the evolution of dental training for our students from a two-year course to a three- and then to a four-year course, I have from time to time advocated the utilization of the summer months to reduce the length of time for study and graduation. In these strenuous times I am again offering suggestions whereby the student may attain all that is required of him and at the same time curtail the length of the curriculum.

The teaching of dentistry proper has no analogue in any other department of science. In all other departments of science taught in schools and colleges, the mental capacity of the student is frequently strained before the end of the term, and brain-fag is likely to occur when pushed to the utmost, as noticed in the report of the Council on Medical Education.

The dental curriculum in our colleges is divided into two distinct departments. It is composed of part mental and part physical training. The principal part of the student's course which qualifies him for graduation is made up of mechanics, where brain strenuousity is not required. He naturally exerts the greater part of his energies in this direction at the expense of the mental and theoretical. The question naturally asked is, Why should not dental schools follow the medical, by adopting a three- or perhaps a two-term yearly course, thereby curtailing the time of the dental students? Surely this can be accomplished to the advantage of both the students and the colleges without detriment to either. The winter course could be utilized for the mental and theoretical, and the summer for the mechanical and practical work. By this method, a year and perhaps more time could be saved.

In other walks of life, such as bookkeeping, typewriting, proofreading, money-counting in the treasury department of the Government, in machine shops, in foundries, in boiler shops, in jewelry manufactories and shops, in sweatshops, and in fact in almost all of the avocations of life, men and women beyond the middle age of life toil from fifty to fifty-two weeks throughout the year, confined in the same close room all day and almost all the time in the same position, usually with artificial lights. Those who do obtain a vacation are satisfied, as a rule, with two weeks. Surely two or three weeks' vacation is all that a young man or woman requires each year while studying for the dental degree.

* *Ibid.*, June 22, 1918.

Brain-fag from overwork due to constant use of one set of brain-cells is overcome by professional men by substituting light fiction reading. By this substitution literary men and scientists may and do live many years without feeling fatigued in the least. The dental student, therefore, has the advantage over all other students in that he can substitute for his winter course of mental training a summer course of mechanics.

A student entering college is always desirous of finishing his studies as soon as possible, so that he may enter his profession and become independent of his family. By the present methods of college teaching he is losing a year's time in the four-year course. This, with the cost of tuition and the expense of office equipment, is quite a drain upon any young man entering upon a professional career.

31 N. State st.

Cancer of the Oral Cavity.

By L. DUNCAN BULKLEY, A.M., M.D., New York, N. Y.,
SENIOR PHYSICIAN TO THE NEW YORK SKIN AND CANCER HOSPITAL, NEW YORK CITY.

THE dentist has a great responsibility concerning cancer of the oral cavity, for he of all others is most likely to see the beginnings of the disease. Every malignant lesion has its origin in an often insignificant focus, and if properly treated at a very early stage the prospects of a cure are immeasurably greater, or rather, the prospects of an unfavorable result are materially lessened; for the end results of cancer of the oral cavity are thus far very discouraging, except in regard to cancer of the lip when taken very early.

During the year 1914 there were in the registration area of the United States 2270 deaths from cancer of the oral cavity, or 4.3 per cent. of the 52,420 deaths from cancer in general, or 3.4 persons per 100,000 living. Of these, 376 were from cancer of the lip, 614 of the tongue, 230 recorded as of the mouth, 851 of the jaw, and 199 others of this class. Of these 2270 cases of cancer of the oral cavity 1878 were in males and 392 in females, 82.75 and 17.25 per cent. respectively, the males being sufferers almost five times more frequently than the females.

Malignant disease is very rare in this locality before the age of twenty-five, there being only 40 deaths reported; sarcoma is the form most frequently found in the young. After the age of twenty-five the number of deaths rises steadily, reaching a maximum of 307 between sixty-five and sixty-nine years of age, and 299 from seventy to seventy-four years.

It may be interesting to note that in the United States registration area deaths from cancer of the oral cavity have increased more than those from the disease in any other locality. Thus in 1900 the deaths were 1.6 per 100,000 population, and in 1914 they were 3.4, more than double, whereas the general increase of cancer mortality during this period was from 63 to 79.4 per 100,000, or 26.6 per cent.

In regard to the early recognition of cancer in many localities it is difficult to speak certainly and concisely, but in cancer of the oral cavity there is less reasonable excuse, and the dentist will often be the first medical man who can give the warning. And this warning should be positive and clear, for even the life of the patient may be dependent upon it.

A lesion which may seem trifling at first may be the beginning of a most serious trouble, quite uncontrollable in later stages. When in doubt as to the nature of the local lesion skilled counsel should be sought.

This is all the more important when it is remembered that it is universally acknowledged that about 90 per cent. of all those once affected with cancer in general, in all localities combined, ultimately die of the disease. Also that from 1910 to 1916 the general death-rate from cancer has risen from 63 to 81.8 per 100,000 of the population, or 29.84 per cent., in spite of intelligent and active surgical treatment.

IMPORTANCE OF ACCURATE DIFFERENTIAL DIAGNOSIS BETWEEN CANCER AND OTHER DISEASES OF THE ORAL CAVITY.

One can readily see, therefore, the great importance of an early and accurate differential diagnosis between cancer and the various disease conditions which may appear in the oral cavity; some of these we will mention briefly, as time would not allow any attempt to detail fully the diagnostic features, which are well given in the textbooks.

(1) *Syphilis.* Next to simple aphthous sores, syphilis is probably the most frequent and important cause of oral lesions to be differentiated from cancer. These are sometimes difficult of absolute diagnosis, though the Wassermann test may often be of great help. Syphilis appears in the mouth as the primary lesion or chancre, mucous patches, and late, gummy lesions. The primary lesion of syphilis or chancre occurs in the mouth often enough to make it an object of interest in this connection, and should never be forgotten. In a study of extragenital chancre* I was able to collect from literature accounts of 9058 cases, of which 1504 were within the oral cavity and 1810 on the lips, making a total of 3314 chancres in this region, or 36.6 per cent. of all cases. Of the oral cases there were 734 recorded as in the buccal cavity, 157 on the tongue, 307 on the tonsils, 264 in the throat, and 42 on the gums, a considerable number of which were attributed to infection through dental work or instruments.

Mucous patches are often with difficulty distinguished from aphthous stomatitis or canker sores, but should never be confounded with cancer, although the latter may occasionally develop on them.

The late gummy lesions of syphilis, especially on the tongue, often resemble cancer very closely, and indeed may be the starting-point of true cancer.

(2) *Aphthous stomatitis* or canker sores are generally easily recognized, but if one or more of them should persist it is always well to consider the possibility of its being the beginning of a true cancer.

(3) *Leucoplakia,* generally caused by tobacco, is often spoken of as a precursor of cancer, but among scores or hundreds of instances of leucoplakia seen I do not recall a single instance in which cancer developed. It is quite possible, however, by bad treatment, as by "touching it up" with nitrate of silver, to goad this and other previously innocent lesions to take on malignant action, and I have seen cancer which had developed on leucoplakia before coming under my observation. Any ulcerative changes on a leucoplakia should always be regarded seriously, as possibly an early cancerous development.

(4) *Simple ulceration of the tongue* or buccal cavity should always receive careful attention, and if persistent should be regarded with suspicion as a probable antecedent of cancer. Broken, rough, or decayed teeth are the chief source of these ulcerations, and tobacco often plays a very important part, as may be judged by the fact that cancerous lesions in the mouth are almost five times as frequent in the male as in the female. On the other hand, where the practice of chewing a mass composed of betel leaves, tobacco, and lime is common, as in the East, these malignant lesions are very common in the mouth of both sexes.

(5) *Tubercular lesions,* or lupus, oc-

* Bulkley, "Syphilis in the Innocent," New York, 1894.

casionally resemble cancer in the oral cavity, but these are rare.

On the lip the dentist may frequently see lesions which are precursors of cancer, and may be the first to give warning. Prolonged fissure of the lip is always significant, and cannot be too carefully guarded. Cancer also follows irritation by pipes and even tobacco used in any form, and a persistent ulceration after a "fever blister" should always be regarded seriously.

It is difficult to describe briefly the characteristics of cancer of the oral cavity. In advanced cases with prolonged ulceration and hard, everted edges, profuse discharge, and much pain, the diagnosis is of course simple. But the very early cases, where the beginning cancerous lesion is only a small rebellious ulceration, with little if any hardness, and very little pain, the certain diagnosis is not easy, even for an expert. And yet these are the cases in which the dentist can render the best service by giving an early warning, which if heeded properly may save untold misery.

The main exciting causes of oral cancer, as has been intimated, are irritating, rough, broken, or decayed teeth, and also ill-fitting plates, etc., together with tobacco, syphilis, and alcohol. But as these causes are continually operating in millions of persons, while so relatively few develop cancer, there must be some predisposing cause which renders the local or exciting cause operative. This constitutional cause I have endeavored to demonstrate elsewhere,* and need not be dwelt on now, other than to state that the dietary and medical treatment of cancer offers the prospect of far better results than have thus far been obtained with the knife. The danger of neglect or even trifling with the beginnings of cancer can hardly be emphasized strongly enough, for it is in its earliest manifestations that this dire disease can be most readily controlled and even removed by medical treatment.

NITRATE OF SILVER CONTRA-INDICATED IN THE TREATMENT OF CANCER.

I have already alluded to the harm that may come to originally innocent mouth lesions by the injudicious application of nitrate of silver, as was formerly so commonly done, but I cannot refrain from again mentioning and emphasizing the matter. It is a very dangerous, and one may almost say a criminal procedure. Its action is far too light and superficial to destroy a malignant growth, and the stimulating effect of nitrate of silver may cause a benign lesion to take on a malignant character.

All stimulation should be strictly avoided, and all sources of irritation removed. Cancer is known to develop under conditions of acidity, as in the stomach, large intestines, and urinary bladder, and the saliva is generally found to be acid in these cases. Only mild alkaline mouthwashes should be employed, and of these sodium bicarbonate is about the best, used freely before and after eating or oftener.

It is impossible in a single brief article to cover all the ground that might be desired, and I must content myself if I have directed serious attention to the share which dentists may have in lessening the increasing morbidity and mortality of what is so often a distressing disease, namely, cancer of the oral cavity.

531 MADISON AVE.

* Bulkley, "Cancer, Its Cause and Treatment," vols. i, ii. Hoeber, New York.

The First Line Trench in Dentistry.

By M. EVANGELINE JORDON, D.D.S., Los Angeles, Cal.

(Read before the Southern California Dental Association, May 28, 1918.)

A GREATER appreciation of the jealous conservation of every minute of time devoted to the program is one of the lessons I have learned from being upon the board of directors of a large club, so I esteem it a great honor to be given a place among your speakers.

For two reasons I am glad to bring my simple message to you. First, because this is a time when scientific prevention is being studied in every detail; and second, because this is children's year. President Wilson, writing to the Secretary of Labor, says: "Next to the duty of doing everything possible for soldiers at the front, there could be, it seems to me, no more patriotic duty than that of protecting the children, who constitute one-third of the population, and I heartily approve the plan for making the second year of the war one of united activity on behalf of children, and in that sense a children's year. I trust that the work may so successfully develop as to set up certain irreducible minimum standards for health, education, and work of the American child."

The draft examinations of our first year of war have focused the attention of the public upon the condition of the teeth of our young men. It is too soon to obtain many statistics in regard to these conditions, but I shall mention a few.

Quoting from a paper by Dr. Adelaide Brown of San Francisco, read at the State Federation of Women's Clubs, in Oakland: "In one group of 8000 men, 480 were rejected because they did not come up to the standard of two pairs of opposing grinders, bicuspids included with molars."

Dr. Costello, of the Medical Reserve Corps of the U. S. Navy, says: "Twenty-seven per cent. of the rejections at the recruiting stations are for teeth which have been neglected until their condition is beyond repair. The minimum requirements of twenty sound teeth, of which there must be four opposing molars and four opposing incisors, with crown and bridge work counting as sound, is fair, and a man's mouth could hardly be considered in good condition without conforming to this requirement."

In Italy 50,000 soldiers have been incapacitated because of defective teeth.

We have no reliable statistics as to Germany, but we know that forty years ago, in preparation for "the day," she began to perform dentistry in the schools. You remember that quite a number of years ago Dr. Moore of Santa Barbara told us that, the clinic results proving unsatisfactory, the German children were being given prophylaxis in the kindergarten.

All this has brought us to realize the urgent necessity of prevention, and such a prevention that we shall not bear the stigma of having a large percentage of our picked population fail in the military examinations because of having defective teeth at an age when they should present almost perfect mouths.

In justice to the dental profession I must say that for years this has been recognized, but the politicians who have controlled our state revenues have been

too shortsighted to make adequate provision for preventive measures, and it still remains the work of the dental profession to build up a public opinion which will force such protection.

Caries of the teeth is distinctly a disease of childhood, and must be combated just as originally smallpox was, and its extermination, while not easy, is just as possible. It is simply a question of education, with every practicing dentist a professor of instruction to his entire *clientèle.*

The causes of early caries are several, among which prenatal conditions play a part. Serious illnesses or shocks to the system of the mother during the nine months of pregnancy may be so registered upon the system of the child that both physically and mentally it may be subnormal. After birth the child who is nursed has twice as good a chance for better dentures as well as better-shaped jaws. The largest percentage of children who need dental care have been bottle-fed.

One of the most frequent mistakes of the past was made at the time of changing from liquid to solid food, because the parent gave semisolids which adhere to the teeth, instead of hard foods which leave the teeth polished and clean. The average American child was, and is, given too large a percentage of carbohydrates in its diet.

To quote Luther Burbank in his work "The Training of the Human Plant" (New Century Co., publisher, 1913), "Growing children need a greater proportion of body-building foods, such as lean meats, fish, milk, some vegetables, and fruits. They are often fed too great a proportion of sweet and starchy foods. A certain proportion of these are absolutely necessary, but we all know the 'starch babies' by their pale, fat, flabby, characterless faces, lusterless eyes, and general lack of vitality." Had he been a dentist he would have added, "and mouths with coated tongues and ropy saliva." He goes on to say: "Less starchy foods and more fresh meats, with eggs, milk, some vegetables and fruits, will give more vitality, a better growth, greater intelligence, better health, and a better constitution, notwithstanding the belief of some of my vegetarian friends to the contrary."

Another mistake often made is to let a child begin breakfast with grapefruit or other acids, followed by a starchy cereal, such as cream of wheat, smothered in cream and sugar. Such children always improve in health when put upon a sensible diet. Mastication plays an important part in the digestive process, and children who have mushes and liquids with their meals seldom learn to masticate—a habit that must be acquired in childhood. Bolting of food has many serious consequences, but in a short paper such as this I shall mention only one, pyorrhea. I have yet to see anyone, who does not exercise his teeth and gums, who has passed middle life without having swollen and bleeding gums.

Adenoids and enlarged tonsils also play their part in caries of the teeth.

The last to be mentioned of the causes of caries is the neglect of the care of the teeth at home. It is surprising that in a day when so much is said of this, there should still be children without toothbrushes, but many young children are brought to me who have never had one.

IMPORTANCE OF SAVING THE FIRST PERMANENT MOLAR.

When caries appears in the mouth of a child two or three years of age, unless careful repair work is done at once and the cause is discovered and removed, the first permanent molar when it appears, at six or seven years of age, has not a chance to survive.

Those of you who study radiographs know how futile it is to expect a perfect occlusion with these cornerstones of the arch missing, and I, for one, can speak feelingly of the suffering due to malocclusion from losing my first molars in my twelfth year.

One cannot say too much of the first molar, the most valuable tooth in the mouth—"the first line trench," to use a war term. Its position makes its loss

one never to be repaired. Anyone who studies the science of occlusion will readily tell you that the first molars are the most valuable teeth, because they are in position during the six years when the deciduous teeth are exfoliating and the permanent teeth are taking their places in the growing arches.

Because it is often mistaken for a deciduous tooth it is neglected; for, alas, there are still dentists who say of deciduous teeth, "Do not bother with them, they will soon be lost," without stopping to explain that a carious deciduous molar does not require the six years it will approximate the permanent molar to be destroyed. One year will be sufficient for that—for destruction is always more rapid than prevention.

You ask the remedy. And I answer: Education! Already it has been started in the schools, first by the clinic, which brought relief to the suffering children and then increased health and vitality. This last year Dr. Proctor has been doing some work by lecture and toothbrush drill in our city schools, but it is a task of such magnitude that each one of the profession must lend a hand, and make it his business to tell one or more people each day the need of care of the adolescent mouth while he is repairing the losses of an adult mouth. The most beneficial treatment is to begin monthly prophylaxis not later than the fifth year. This treatment cannot be too carefully emphasized.

The preponderance of soft carbohydrate foods in the diet is one of the causes of so many children entering the kindergarten with their teeth broken down to the gums and with small, undersized jaws. One of our responsibilities is spreading the knowledge that no demineralized white bread or crackers should ever be given to a child under five years of age. We not only need all the lime salts contained in dark breads to build the teeth and bones, but we need exercise to develop the jaws. Children who eat tough bran bread made into toast instead of mush, and who do not drink while eating, usually get the proper development of the jaws.

Mouth hygiene, to be effective, must be begun as the child enters school, not left until the first permanent molar is breaking down.

Unless you have examined the mouths of the children in a kindergarten you have no idea how many of them have from one to six or seven, and I have treated as many as ten, teeth with abscesses and with the gums covered with spongy fistulous openings. Under modern conditions of bottle-fed babies, impure foods, and crowded city life, a large number of children begin to need dental attention in the second and third years, and often some of the teeth are lost by the fourth year.

Anyone who is not familiar with such cases can readily imagine the great strain upon the system due to the septicemia that quickly follows the death of one or more pulps in a child's mouth. I leave you to picture the condition of such a child when it reaches the age to enter kindergarten, if it lives so long: Sickly — anemic — irritable — stupid! Every child compelled by the law to attend school has the *right* to be protected from the spread of disease through the germ-laden breaths of the filthy mouths of such children.

BEST METHOD OF CARING FOR THE TEETH OF SCHOOL CHILDREN.

In working for very young children I have found that if the teeth are polished once a month and given reasonable care at home, no cavities will form.

In an endeavor to find the most economical way in which to care for the teeth of school children, I have come to the conclusion that the following plan will produce the best results, because the work is begun before or at about the time of the eruption of the first permanent molar, which under present conditions is more often lost than any other tooth in the mouth—a loss irreparable to the whole system of the child:

(1) Have the teeth of all children filled, when necessary, before they enter the kindergarten.

(2) Have a daily morning cleaning of

the teeth as part of the exercises in the kindergarten.

(3) Mark children upon their oral hygiene just as upon reading or spelling.

(4) Arrange games that will develop strong, correctly shaped jaws, such as lifting weights with the teeth, or rapid running with tightly closed lips.

(5) Give all the children in the kindergarten and the first grade monthly prophylaxis.

This last undertaking sounds formidable, but it could easily be managed at a small expense by having an auto van fitted as a dental office, to carry four dental chairs and an office desk. The force could consist of one dentist with four dental nurses and an assistant to sterilize instruments. The van could be moved from school to school, the work in each school requiring part of a day only.

The electricity for the dental engines and sterilizer could be furnished by the engine of the van. Water could be connected at any hydrant, and the waste pipe could be connected with the sewer. The dentist in charge could oversee the work, mark the school cards, send any unusual cases to the established dental infirmary, and lecture at mothers' meetings.

The result of such work would be magical. Epidemics of colds, measles, whooping-cough, etc., would be almost unknown, and the amount of school work accomplished in each room would be greatly increased. This would be one of the best ways to fight tuberculosis.

The final argument in favor of such a method is that the school should teach the children the most valuable lessons in life—physical development and keeping the gateway to the body clean—by repeated lessons, just as it teaches them to read.

The Southern California Dental Association has been trying to educate the people since 1901. The question is, Have we tried hard enough and in the right way? Are there more perfect first molars or not? Also, what is being done to banish children's diseases? To be sure, when a child has measles or whooping-cough he is sent home, but is not often kept in quarantine; so he plays around the neighborhood and all the children under school age in the neighborhood may be exposed. This would not be so serious a matter if only the child in school were affected, but it is the child under school age, the baby brother of six months (who is on the bottle), or the little sister of two years, either of whom may not possess great resistance to disease. In such a case the fever may run such a course that malnutrition with lowered vitality will arrest the developing permanent teeth. Hypoplasia of the first permanent molar often results, decreasing its value fifty per cent.

With healthy children, a monthly polishing of the teeth and proper care at home is sufficient, but since many children are below normal in health, it requires watchful care to save the first molar. In such cases, when the tooth first appears the fissures may be polished with an orange-wood stick and pumice, then dried with alcohol, and cement flowed in, filling it nearly even with the cusps. When the occluding tooth comes into position, this will gradually wear down. Later, if the fissures darken and any softening is found, remove all caries and extend the cavity with a shallow undercut to the ends of the fissures and fill with copper amalgam. I believe there is no preventive measure of greater value than these copper amalgam fillings in unhealthy mouths.

You all know my views with regard to silver amalgam fillings in the mouths of youth. There is only one place in which I use them, and that is in the mesial cavity of the first molar before the bicuspid comes into position, and I am not sure that they are satisfactory there.

The perfecters of the gold inlay have done great service in giving us an easy and a nearly perfect way of repairing the first molar, taking into consideration the fact that no repair can be as satisfactory as healthy tooth structure. However, in its use great care must be taken in preserving correct points of contact.

When the pulp of the tooth is involved, one must be most conservative and exhaust every resource to keep the pulp alive until root formation is completed.

Here the X-ray is our valuable aid in watching the progress of the treatment. Every ounce of skill we possess should be marshaled to our assistance in the care of such cases. Every rule and every preventive detail of sterilization should be followed in filling the root-canals.

But above and beyond all, let us build up a plan to prevent this loss of the first molar in youth, and save the future dentist the intricate and nerve-racking task of saving these forlorn hopes.

Let us do our part in this children's year by teaching every mother in America to watch for the arrival of the first molar after a child is five years of age, and to have the mouth in proper array for this the most-valued tooth—our *first line trench* in dentistry!

What is to hinder the dentists of America from adopting the most successful movement of the day? Why cannot we, too, start a *drive*—a drive to save the first molar, the innumerable first molars? Why cannot the dental associations ask the many "children's year" committees to devote at least one week this fall to the education of the mothers of America, to emphasize the value of, and teach them to save, the first permanent molar!

1123 Marsh-Strong Bldg.

The Pathogenesis and Treatment of Pyorrhea Alveolaris.

By B. KRITCHEVSKY and P. SÉGUIN,
OF THE PASTEUR INSTITUTE.

(Translated from *la Presse Médicale*, Paris, May 13, 1918.)

THE medical profession has long ignored the importance of pyorrhea alveolaris in its relation to systemic conditions. However, in the course of the last few years numerous secondary complications have been attributed to it, such as arthritis, myositis, endocarditis, neuritis, and even gastric ulcer and appendicitis. In the presence of these infectious conditions, the medical practitioner is under obligation to examine the state of the oral cavity, if he fails to find elsewhere the cause of the disease.

(I) The pathogenesis of pyorrhea is still under discussion. This disease has been attributed to the oral representatives of the pneumococcus-streptococcus group, to the endamœba gingivalis, or to various other organisms. Corresponding with each of these conceptions, there has been advocated a particular treatment.

The oral pneumococci and streptococci have been incriminated by a number of authors, certain of whom have sought to contend with these germs by vaccines, either autogenous vaccines prepared from one or several species or stock vaccines. Vaccines in which the organisms have been killed by heat or sensitized vaccines or iodized vaccines have been employed, and the results obtained in this way have in general been satisfactory. This is not surprising, because even if the organisms against which this form of treatment was directed are not the actual etiologic factors in pyorrhea, they nevertheless are not inoffensive, and they contribute toward maintaining the suppuration.

The amœbic theory gained some wide degree of popularity, and accordingly attempts have been made to treat the affection by injections of emetin, but recent work has shown that endamœba gingivalis cannot be considered as the causative agent in pyorrhea. As far as our own experience goes, in the numerous cases which have been studied, we have never with any constancy demonstrated the presence of amœbæ.

Let us add finally that quite recently Mendel(1) has isolated from cases of pyorrhea alveolaris various bacteria, with which he was able to reproduce in animals lesions with symptoms resembling those of the human disease.

Whatever be the cause of pyorrhea and the general treatment followed, there is nevertheless one point upon which all specialists are in accord, namely, the absolute necessity of a well-performed and persevering local treatment. It is important to remove by most careful scaling all of the deposits which have formed upon the roots of the teeth. This material, by its mere presence, irritates the gums and denudes the teeth, impinges upon the periodontal ligament, and breaks up the intimate union of the root with the alveolus. Tartar plays in the genesis and in the recurrence of the affection an etiologic rôle of the first order, and therefore it must be unconditionally removed.

(II) In May and then in September of 1915 there appeared the work of Barton L. Wright(2), who detailed the treatment of pyorrhea alveolaris by intramuscular injection of succinimid of mercury. The dose employed was from 12 to 26 mg. for women and 65 mg. for men. In the cases of 60 patients thus treated, the pyorrhea was cured, and with it the secondary intercurrent infections, such as arthritis, etc. The author thought that the mercury acted as a powerful antiseptic, destroying the oral pneumococci and streptococci.

We have employed this method, as well as the others before mentioned, and have been struck by the good results which often are secured. Following the mercurial treatment, the pyorrhea was clinically improved, the secretions dried up or were greatly decreased, and the gums once more became firm.

If the discharge be examined before and after treatment, one fact stands out prominently, *i.e.* in cases not yet treated, besides a great variety of diverse microorganisms, there swarm innumerable spirochætæ. As a consequence of the mercurial treatment, in the majority of cases, these spirochætæ almost completely disappear from the secretions.

These facts led us to think that the cause of pyorrhea alveolaris might be primarily due to the local abundance of one or several species of oral spirochætæ, with which there were secondarily associated various other microbes. The disease would then be in our estimation a spirochætosis, complicated by diverse microbian associations (symbioses).

Smear of gingival exudate from an untreated case of pyorrhea alveolaris. Stained by the ammoniacal silver nitrate method of Fontana-Tribondeau. (Note predominance of spirochætæ and their great diversity of forms.) Magn. Zeiss obj. 1/12, oc. 6.

From this standpoint it is interesting to note that in 1912 Noguchi(3) isolated from pyorrhetic pus a treponema, T. mucosum, to which he attributed a certain rôle in the production of the fetidity of the pus.

We then conceived the idea of trying in the treatment of pyorrhea alveolaris the spirochæticidal medicaments, which are more energetic than the salts of mercury, such as the arsenical compounds "606" and "914." Huchard had already employed such treatment in Vincent's angina. Nevertheless, as these medicaments have quite numerous contra-indications and require a somewhat delicate manipulation in administering, we had hitherto hesitated to resort to intravenous injections.

Quite recently we came upon the work

of Kolle([4]), who claims to have cured 90 cases of pyorrhea by intravenous injections of neosalvarsan (maximum dose of 30 centigrams), and this in the absence of any local treatment. After three injections at most, the most obstinate cases were cured. In Kolle's opinion, the causative agent is a special spirochæte, large, with wide curves in its spiral, morphologically greatly resembling the spirochæte of recurrent (relapsing) fever. This organism disappeared completely from the gingival exudate after the arsenical treatment.

Desirous of controlling Kolle's observations, which confirmed our facts and corroborated our hypotheses, we consulted with Professor Jeanselme, in whose service there are daily given a large number of injections of neosalvarsan. Professor Jeanselme very kindly authorized us to make the needful observations upon the patients of his service, and we are happy to acknowledge here our gratitude to him.

In order to study the action of the specific treatment, and in particular the action of neosalvarsan upon the oral spirochætes, we worked with samples of the gingival exudate in a large number of patients who were undergoing treatment, 244 subjects being thus examined. The exudate was taken from many places in a pipet, diluted with water and spread upon a slide, then stained with Tribondeau's methylene eosinate.

Of the 244 patients, some (110) had never been treated; others (134) had on the contrary already undergone specific treatment—mercury in one or another of its various forms, injections of "606," or of neosalvarsan. Of these 244, 43 were affected with advanced pyorrhea; 62 presented only the first signs of this disease, a large accumulation of tartar and slight recession of the gums; in 139 the gums were normal.

We have classified the results of our observations in Table I.

The following comments are suggested by this tabulation:

(A) In three-fourths of the cases of pyorrhea spirochætæ are abundant. If the patients have not previously undergone any specific treatment, there are in almost all cases (24 as against 2) an abundance of spirochætæ. The cases of pyorrhea in which there are only a few or even none at all of these organisms (11) are particularly to be seen in individuals already treated.

When pyorrhea is in its initial stages, spirochætæ are found in half the cases (31 out of 62). When the mouth is healthy, the spirochætæ are rare or absent in about three-fourths of the cases (101 out of 139).

(B) In half of the 110 cases never having had specific treatment, spirochætæ are abundantly encountered in the gingival exudate.

Out of the 143 subjects already treated by specific medicaments (Hg (mercury), "606," "914"), spirochætæ

TABLE I.—FREQUENCY OF SPIROCHÆTÆ IN THE GINGIVAL SECRETIONS OF PATIENTS, SOME OF WHOM HAD SUBMITTED TO SPECIFIC (ANTI-SYPHILITIC) TREATMENT, OTHERS NOT.

Spirochætæ.

	Abundant.			Rare or Absent.		
	Cases not treated.	Cases treated.	Total.	Cases not treated.	Cases treated.	Total.
With pyorrhea, 43 cases	24	8	32	2	9	11
Mild pyorrhea, 62 cases	12	19	31	10	21	31
No pyorrhea, 139 cases	19	19	38	43	58	101
Total, 244	55	46	101	55	88	143

are found only in a third of the cases.

Let us now see the action of neosalvarsan treatment upon the spirochætæ of the mouth. We have followed the effects of repeated injections of neosalvarsan in the cases of 100 patients, who have received from 6 to 10 injections of 10 to 60 centigrams.

Of these 100 patients, 42 possessed, before beginning the treatment, many spirochætæ in their gingival exudate. The following tabulation gives a *résumé* of results observed:

TABLE II.—EFFECT OF REPEATED INTRAVENOUS INJECTIONS OF NEOSALVARSAN UPON THE SPIROCHÆTÆ OF THE GINGIVAL EXUDATE.

		Spirochætæ.	
		Disappeared.	Always plentiful.
Marked pyorrhea ...	13	7	6
Mild pyorrhea	13	11	2
No pyorrhea	16	11	5
Total	42	29	13

Thus the treatment resulted in the disappearance of the spirochætæ in 29 cases (about 70 per cent.); on the contrary, in 13 cases the action of the neosalvarsan was not appreciable.

The cases of pyorrhea were always clinically ameliorated, and in more than half of them the spirochætæ disappeared from the exudate. It must be noted that this disappearance is never complete; the organisms remaining are represented by the rarer forms, which are few in number, thickened, swollen, and inactive.

Without being as schematic as those of Kolle, the results which we have obtained are nevertheless demonstrative. And this is the more significant, as none of these patients had undergone local treatment. The irritating tartar had been left intact. In some cases the medicament could not reach the spirochætæ, which were hidden in almost completely closed pockets.

Finally, besides these cases treated by intravenous injections of "914," we have cared for some patients affected with pyorrhea by local instillations of neosalvarsan in solution or by application of the medicament in powder form into the pyorrhetic pockets. The results, both from the viewpoint of clinical improvement and from that of the rapid disappearance of the spirochætæ, have invariably been remarkable.

(III) How should pyorrhea be treated? The treatment should be both general and local.

(1) The general treatment consists of intravenous injections of neosalvarsan (10 to 30 centigrams). If this be contraindicated, or if particularly technical difficulties present, intramuscular injections of succinimid of mercury may be substituted therefor.

(2) The local treatment is just as necessary. If the tooth be very loose and its alveolus destroyed (the radiograph will indicate this), it is useless to expect the tooth to again become firm, and the best thing to do is to extract it.

If the alveolus be only partially involved, a most careful scaling and even polishing of the root should be practiced. To aid in the disintegration of the calculus, it is advisable to use fluorin salts to render it more friable.

Finally, in addition to this mechanical treatment, the spirochætæ may be directly attacked by instilling active medicaments (neosalvarsan in solution or powder) into the pyorrhetic pockets.

But this chemotherapy does not establish immunity. Relapses and returns of the infection are always to be feared. The sole method of preventing them is to impress upon the patient the necessity for a thorough and unrelenting course of oral hygiene. The patient should learn to clean his teeth with the greatest care, or in default of this, to have frequent recourse to the attentions of a specialist.

BIBLIOGRAPHY.

(1) MENDEL. Comptes rendus de la Société de Biologie, Paris, Dec. 22, 1917, p. 902.

(2) WRIGHT, BARTON L. DENTAL COSMOS, Sept. 1916, p. 103.

(3) NOGUCHI, H. *Journal of Experimental Medicine*, 1912, p. 194.

(4) KOLLE. *Medizin-Klin.*, Jan. 31, 1917, p. 59.

Success in Oral Restoration: What are the Fundamental Principles upon Which It Must be Based?*

By JAS. KENDALL BURGESS, D.D.S., New York, N. Y.

(I.)

(Read before the Northern District Dental Society, Bronx and Westchester Counties, N. Y., May 23, 1918.)

IN entering upon a consideration of our subject it seems wise to determine just what is meant by the term "oral restoration," and what is intended to be accomplished by such an operation.

Perhaps the first word that should be said is that, in a strict sense, there is no such thing as restoration. The best we can hope to achieve is not restoration but substitution; but we use the word "restoration" because it is the ideal—even though, like all ideals, unattainable—toward which we direct our efforts, and because it conveys a more pleasing picture to the mind.

Lest we forget, and in order that we may get a wider and clearer perspective, let us come back for the moment to the A B C, as it were, and consider briefly the normal oral cavity and its contents—the departure from which normality makes restoration necessary—with some, at least, of its relations and functions.

Nature has provided the human organism with a marvelously constructed and co-ordinated apparatus which we know collectively as the denture. This is divided into upper and lower halves, and each half is subdivided into numerous segments or units or teeth varying in size and shape according to location and the particular service for which nature intended them. Each tooth comprises an exposed or visible portion—the crown—and one or more submerged subdivisions or roots by means of which it is anchored in position, and every tooth is composed of five tissues, viz, enamel, dentin, cementum, the pulp, and the peridental membrane. Surrounding each root is a bony wall, forming a receptacle or socket which is called the alveolus, and this in turn is part of the mandible or maxilla, as the case may be. Overlying these bony structures or jaws and coming in contact with the teeth at their necks where root and crown meet is the dense vascular tissue—the gum.

The gum conveys nourishment and affords protection to the bony structures, and the bone in turn provides anchorage for the teeth, and sustains the burden and the stress of the service to which they are put. The tough, fibrous peridental membrane serves as the medium of union between the tooth and its supporting alveolus, and cushions the bone from the direct force or shock of the impact produced in the performance of its mechanical function. The cementum or covering to the root affords a suitable material for the embedding and attachment of the fibers of the peridental membrane just described.

The dentin gives bulk, general conformation and color to the tooth, houses the pulp and supports the enamel; and the enamel, largely a mineral substance,

* [This is the first paper of a series to be presented by the author on the fundamental principles of oral restoration.—Ed.]

gives final form and shade to the crown of the tooth, and constitutes nature's protecting covering to the more highly organized and sensitive interior tissues, standing as it does between them and frictional wear and tear, thermal changes, the products of fermentation, and all external influences to which the teeth are subjected. The pulp is the supply conduit that forms the vital union between the tooth and the vascular and nutrient centers of the organism. The function of the peridental membrane is more particularly that of a local mechanical bond of union between the tooth and its bony anchorage, while the pulp constitutes the means of communication that brings the tooth into relation with the great outlying influences in the body, giving it a larger community interest and a more important status in the society of members of the human body, incidentally greatly increasing its responsibility to these other members of this society for its good behavior.

The individual teeth of each half of the denture bear a relation to their fellows of close contact on their proximal sides for mutual support, and for mechanical protection to the supporting tissues which form thin partitions between their necks. The opposing halves of the denture bear to each other a relation in which the free ends of the lower half come into contact with those of the upper half, completing an arrangement which we describe as occlusion. The functions of the denture as a whole which here concern us most are the esthetic, for which the anterior teeth are more particularly responsible, and the masticatory —or first aid to digestion, performed principally by the posteriors and resulting from a triturating or grinding movement of the lower half of the denture against the upper, operated by a series of tissues or muscles in their function of alternate relaxation and contraction which we describe as muscular action.

This is a brief analysis of the divisions and subdivisions, with some of their relations and the functions which concern us most, of the apparatus with which we have to deal. These facts are so elemental and so obvious that they ought scarcely need repeating. But I have done so for two reasons: First, because a recital of them is necessary to the development of my thesis, and second, because their very familiarity breeds a spirit of forgetfulness if not of contempt, and there is danger that we lose sight of their significance and their importance, as some indeed seem prone to do. It is intended to refresh our memories and recall more sharply to our attention the correlation and interdependence of these organs and tissues, and their relation and importance to the rest of the organism.

It is the impaired or lost units of this denture for which, when accident or morbid process has wrought its havoc, we are called upon to make substitution, and our effort and its results are what we characterize as "oral restoration."

The question to which we seek the answer is, "What constitutes success as applied to our undertaking, and how shall we attain it?" At first thought the answer seems simple enough. It is not so clear, however, but that there is room for confusion of ideas and errors of judgment. This I believe is due to our failure to discover and apply the bedrock principles which must underlie our efforts. We discuss technique, quibble over its details; lose ourselves in its intricacies and, enticed to ridiculous extremes by the almost hypnotic influence of its mechanical fascinations, we make of it, all too often, the end instead of the means by which we attain the end. Dazzled by its shallow glare, we fail to penetrate beyond its surface to the discernment of the deep-laid vital principles which underlie, and to which technique should merely give expression. Technique is a fleeting and evanescent thing. The practices of yesterday are altered today and supplanted tomorrow, but the ideals which should lure us and the fundamental principles upon which they are based belong to the eternal verities. They are the same yesterday, today, and forever. "A wise man," said the Master Builder, "built his house upon a rock; . . . and the rain descended, and the floods came,

and the winds blew, and beat upon that house; and it fell not; for it was founded upon a rock. . . . A foolish man . . . . built his house upon the sand; and the rain descended, and the floods came, and the winds blew, and beat upon that house; and it fell; and great was the fall of it."

These are the types and symbols of success and failure in every age and in every effort at construction, whether it be of character or of concrete. The difference goes far beneath the superficialities of materials and technique to the visualization of ideals, the spiritual discernment and utilization of those factors which make for durability and permanence, the selection of motives, the adoption of principles, the choice of foundations. This accomplished, technique will develop and mature into the finished product, as the grain comes to fruition out of soil well prepared and properly nourished.

Technique is an expression of personality, temperament, disposition, opportunity, and there are as many variations in technique as there are in personalities and temperaments and dispositions and opportunities. But beyond all these, and deeper than all are character, the ruling motive, the governing principle, and the abiding foundation of life. These are what we seek as the bases of our efforts.

It is very patent that every bridge work restoration must be a two-part institution—the substitute or superstructure, which the operator supplies, and nature's own foundation in the oral cavity, comprising the teeth with their component tissues and their investments, each with its individual functions and relations.

The status of every tooth with which we have to deal and its investment as integral parts of the human organism compels our consideration and our treatment as a surgical undertaking; their function as parts of a mechanical apparatus requires our management as an engineering problem, and their potential esthetic value by reason of their prominence amid the features demands our care and attention from the artistic point of view. Add to these the requirement of good workmanship which must characterize every successful undertaking, and we have surgery, engineering, art, and workmanship as the four-square, rock-ribbed foundation upon which every successful effort at restoration must be based. We may vary methods and technique, but we cannot alter these principles. Every effort at restoration which ignores or violates any of these fundamental essentials is a failure to the extent of such neglect or violation, whatever apparent success may attend it, because it is inherently vicious or deficient, and because what is inherently and fundamentally wrong cannot be made right by any external show of excellence or superiority; and no amount of theorizing can make it right.

When the profession has accepted these fundamental truths and so established this immovable foundation as the basis of our efforts, then we can begin to discuss intelligently types and systems of restoration, and the details of technique by which they are accomplished.

But it is idle to talk about removable bridge work or fixed bridge work, about the shell crown, the Alexander hood attachment, the Hinman "2-step, 3-pin," the Carmichael attachment, the telescoping crown, the split bar, or any other method or device or detail until we have gone beyond these secondary things, and laid our foundation on the solid rock of the primary requirements. Then and not until then shall we have some standard of perfection, as it were, as a basis for testing and comparing the merits of our systems and our technique; and with this accomplished we shall be less fascinated by gimcracks and fripperies, and ask ourselves the serious question, "Is this the best surgery, is this the best engineering, is this the best art to apply in this particular case?"

Much has been said in recent years about the lack of standards in bridge work and the necessity for standardization of bridge work. These things are true and important, but we cannot standardize personalities and dispositions; we have to begin at character. Just so, we cannot standardize systems and

methods and technique until we have gone to the root of the matter, and standardized or comprehended the fundamental principles on which they are based and out of which they grow. When these fundamentals are established in our thinking and our practice the details of system and method and technique will take care of themselves. All of our efforts in restoration must come under one of these four heads. For example, many essayists and discussers have harped on the necessity for anatomical conformation, which is well as far as it goes, but is not basic. It is merely a means to an end. If we analyze anatomical conformation we find it serves three distinct purposes, protective, mechanical, and esthetic. Its achievement, therefore, so far as it relates to the protective function comes under the head of surgery; so far as it concerns the mechanical it pertains to engineering, and so far as it has to do with the esthetic it belongs in the realm of art. So it is with the preparation of the abutments, the management of the occlusion, and all the other details with which we concern ourselves. In the last analysis they all are traceable to one of these four fountain-heads of successful restoration—surgery, engineering, art, and workmanship.

All of our restorative effort that relates to the pathological-physiological status and relations and welfare of the teeth and tissues of the oral cavity is within the province of surgery. Everything that pertains to the mechanical-physical relations, requirements, and functions is in the domain of engineering. Whatever has to do with esthetic values and cosmetic improvement and integrity belongs to art, and all of our constructive operative and prosthetic effort is comprised in workmanship.

May I quote at this point just one paragraph from a former article:

> It is not enough that we be merely good jewelers, and our productions conformed even to the highest standards of that art or trade. A bridge-work restoration in its highest development is not a mechanical operation, and the man who performs it on that basis has failed to catch the vision and to comprehend its true mission. To be sure, the details of its execution are mechanical, just as no surgeon ever took a scalpel and opened into the abdominal cavity that he did not do a mechanical thing. But it is the subject of our operations and the object for which we perform them that lift them out of the sphere of butchery and mechanics into the realm of surgery and art. To serve its highest mission every bridge-work operation should combine good surgery, good engineering, good artistry, and good workmanship, and any operation which falls short in any of these particulars fails in the degree in which it is thus deficient.

It has not been the purpose of this paper to elaborate the details of the practice of surgery, engineering, art, and workmanship as they apply to oral restoration, but to try with all the emphasis at my command to establish in our thinking the necessity for anchoring our efforts, not in the shifting sands of technique nor the insecurities of systems and methods whose chief claim to consideration is the mechanical excellence of their products, but to the only secure and abiding foundation—laid four-square in surgery, engineering, art, and workmanship—which alone can impart to system and method and technique that excellence of character, durability, and permanence that withstand the ravages of time and the combative forces which operate against them, symbolized by the house founded upon a rock.

149 Broadway.

The Diagnosis of Malocclusion in Its Early Stages.

By FRANK A. DELABARRE, A.B., D.D.S., M.D., Boston, Mass.

(Read before the Connecticut State Dental Society, New Haven, Conn., April 18, 1918.)

THE necessity for early recognition and diagnosis of malocclusion is the logical outcome of the advance that has been made in the science of orthodontia in the last few years. In the treatment of malocclusion it is now well established that "preventive orthodontia," undertaken very early in life, just as soon as a positive diagnosis can be made, has supplanted the old "corrective" idea of waiting until the twelfth year or later. The results obtained are much nearer the "normal" in every respect, and the expenditure of time and effort is very considerably less. Another decided advantage is the almost complete elimination of pain. Nature responds to the mechanical stimulus of the appliances more readily and successfully at the time when growth in the different zones and directions is due to occur.

The conception of normal occlusion as presented in the various textbooks is that of the adult, and there is no consideration given to the normal below the age of twelve. There is and must be a normal for every stage in facial development, and while the deciduous and mixed dentitions resemble the adult occlusion in the arch-curve arrangement, there are several physical characteristics that differ materially from those of the adult occlusion, particularly the overbite of the incisors and the absence of the curve of Spee.

Through this new conception of the normal course of development from infancy to adult life the malocclusions occurring at twelve years of age and later are seen to be only progressive and very complicated stages of maldevelopment, which can be traced step by step back to very small and simple deviations from the normal, occurring at a very early age.

The present state of our knowledge shows that malocclusion starts very early, and that it can be diagnosed surely between three and five years of age. Study of neglected cases of malocclusion develops the fact that, once started unmistakably toward maldevelopment, they never tend to correct themselves, but always grow progressively worse.

As to the prevalence of this unfortunate condition, it may be stated that 95 per cent. of the children under sixteen examined at the Forsyth Infirmary presented cases of malocclusion.

There is no scientific data at hand to support it, but a conservative estimate of the whole situation would give 80 per cent. of children in America at the age of three years enjoying normal occlusion, while 80 per cent. of adults have malocclusion.

ETIOLOGY OF MALOCCLUSION.

In considering the etiologic aspects it may be briefly stated that malocclusion is seldom a local disturbance due to local causes with purely local effects, but is more often merely a local "symptom" of larger and more remote causes that are producing similar results elsewhere in the bodily economy, such as organic defects or functional derangement attended by the consequent end results that are serious in their menace to health.

Two deductions may be drawn from this phase of the subject. Many of the causative factors are operative long be-

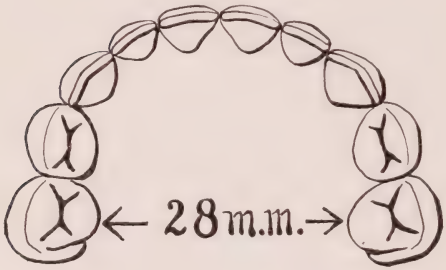
fore a positive diagnosis can be made, and cannot be eliminated or corrected by mechanical means alone.

Malocclusion deserves more attention from the profession because of its undoubted effect on the general tone and health of the individual. The diagnosis of any case rests on the conception of the normal, and a recognition of deviations therefrom.

EARLY DIAGNOSTIC SIGNS OF MALOCCLUSION.

It is not the purpose of this paper to describe in detail normal occlusion and its development, but to present a series of the most frequent symptomatic and diagnostic signs, occurring early in life, that may be relied upon unquestionably

Fig. 1.



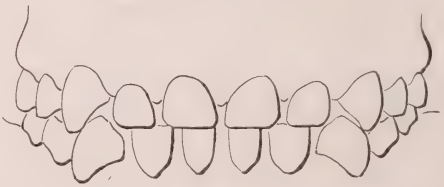
as indicating an already existing malocclusion that has passed the stage when its diagnosis might be a matter of opinion or dispute. They are presented as personal convictions based on years of experience in private practice and in handling large public clinics. Do not underestimate the importance of these signs because of the small degree of deviation from normal relationships, as their significance lies in the interpretation of the causes that are responsible for these small, first digressions from the normal direction of growth and the inevitable progressive malocclusion that will result.

In Fig. 1 we have illustrated an upper arch with the teeth in a good arch curve, with proper contacts between the teeth. Actual measurements of these teeth, as measured by the Bogue system across the palate at the gingival line of the second deciduous molars, show 28 mm. Dr. Bogue says that any child of four, who measures 28 mm. or less, has delayed development, and has not the physical vigor to get back to normal, and will inevitably have progressively irregular teeth.

Fig. 2.

Even with a good arch curve and good occlusion, it is already a case of malocclusion, because the child at three years had this identical arrangement of the teeth. Between three and five years of age there has been no growth; so what is normal at three years of age, becomes abnormal at five.

Fig. 3.



This measurement of Bogue of 28 mm. means this: In all the cases with which he has come in contact, there has not been one case which has presented this measurement or less but what has developed a malocclusion later.

We may take this as the starting-point to get an estimate of our cases.

Fig 4 is the front view of a case of malocclusion. This represents the normal arrangement of the teeth of a child

of three years of age with a small amount of overbite and with a registration at the median lines; but if the child arrives at the age of five years without the evidence of growth and development, at that age it constitutes a malocclusion.

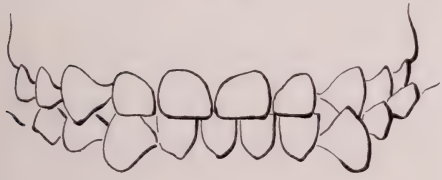
The evidence of growth seen at the age of five is the appearance of the interspaces coming between the incisors. As the permanent teeth grow and erupt, the

Fig. 4.

force of the growth and eruption causes the spreading of the incisor teeth, as is shown in Fig. 3, which is the normal for that age.

I want to call your attention to two or three points with regard to the normal deciduous denture. There must be the registration of the median lines, and the arch curve must be even and regular. Fig. 8 shows that the curve of occlusion

Fig. 5.



so called—the curve of Spee—the curve of compensation, is absent at this age, and we have an almost exact plane of occlusion. This is one of the distinctive differences in the child's dentition.

One other point in regard to the antero-posterior relation: In the adult, the point of the upper cuspid comes between the lower cuspid and first bicuspid teeth. In the deciduous dentition, the forward position of the lower cuspid is very much less than in the permanent dentition. The distal edges of the upper and lower deciduous second molars are almost—if not exactly—in the same vertical plane. This is the diagnostic sign of the normal antero-posterior position of the mandible in the temporary and mixed dentition.

In Fig. 2, there is a disturbance of the lower arch curve. Here we have rotation of the left central and lateral teeth. These teeth are out of their proper position in the arch curve, and when this occurs, together with a narrowing of the arch itself, it is a positive diagnostic sign of an existing malocclusion.

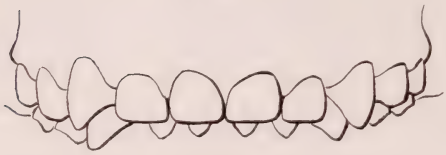
Fig. 5 shows the spaces between the lower incisors beginning to appear, and we have a good arch curve. It may measure even more than the 28 mm. across the arch. It may answer all the requirements of normal occlusion, except one, and still be a malocclusion, and that requirement is that the incisor median lines shall coincide. The lower mesial line is shifted to the left. This is extremely important, because of the significance that attaches to it. It means that there is beginning, and has already progressed to a considerable degree, a lack of lateral symmetrical growth, and it may or may not result in a cross-bite on one side or the other.

This class of malocclusion is one of the most difficult the orthodontist has to deal with, presenting very difficult problems. The proper time to correct this is when it first starts wrong, because in all of the cases that show a deviation, if the arches are restored to harmonious and normal widths, the deviation will correct itself automatically; but where it progresses to twelve or fourteen years of age, we have a deviation in the development of the entire face—the mandible is thrown to one side, the nose is divergent from the median line of the face, and there is a twisted facial expression; and it all starts in this lack of symmetrical lateral development.

Another class of case is shown in Fig. 6, where there is an excessive overbite of the upper incisor teeth. They are hiding the lower incisors. The significance of this condition lies in the fact that it is not always, and in fact is sel-

dom due to the elongation of the upper incisors, but is more often indicative of a lack of vertical development in the deciduous molar region.

Fig. 6.



When you see a case with the excessive overbite, that child is not growing vertically as fast as it should in that region, and it is a positive indication of an ex-

Fig. 7.

isting malocclusion, and should be dealt with immediately.

Fig. 7 shows infra-occlusion of the deciduous incisors. This is generally caused by a faulty tongue habit.

Fig. 8.

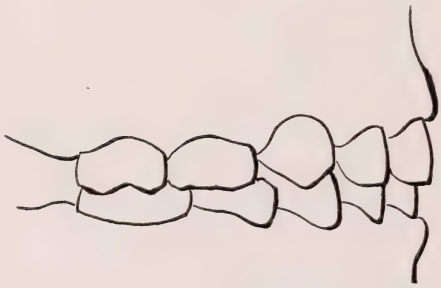
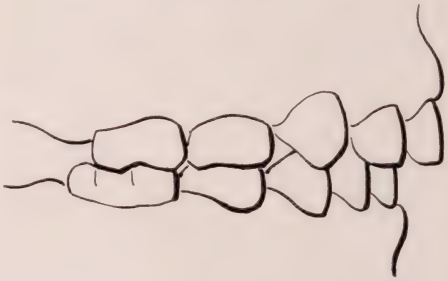


Fig. 9 represents a disturbance of the antero-posterior position of the mandible, it being too far back in relation to the upper. According to Angle's classification, this is a class II case, or distal occlusion.

Fig. 10 shows the reverse of this; where the lower jaw is thrust too far forward or, according to Angle, a class III case.

These are the seven diagnostic signs of malocclusion most frequently met in

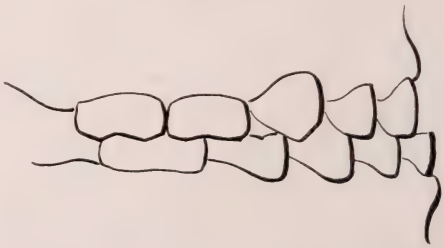
Fig. 9.



studying these cases of development. They may occur in various combinations, but the existence of any one is sufficient ground on which to begin correction.

These may be used by the general practitioner to help him to give proper advice to parents who consult him in regard to their children's occlusion, and

Fig. 10.



it is hoped that the profession will cease advising parents to "Wait until the child is twelve or fourteen," or "Let us wait and see if it will not tend to correct itself."

520 Beacon st.

[See also *Discussion,* as reported under "Proceedings of Societies," this issue.]

History of the Dental Society of the State of New York.

By WM. CARR, D.D.S., New York, N. Y.

(Read at the fiftieth anniversary meeting, Saratoga Springs, June 13, 1918.)

TO give in detail the history of this society, which has reached a maturity of fifty years, would both sorely tax your patience and far transcend the time allotted for this paper. It must suffice, therefore, to sketch as briefly as may be what the society has done toward effecting the purpose of its organization.

THE STATUS OF DENTISTRY PRIOR TO 1868.

Prior to the year 1868, there was no law in this state regulating the practice of dentistry. Popular opinion failed to realize the scope and importance of dentistry or to hold it in due esteem. Even the courts in various jurisdictions failed to do so, or to rate it as a profession; and even today it is not universally so rated. Dentistry has been held in adjudicated cases to be a handicraft and its operative instruments to be mechanics' tools, exempt as such from attachment and levy of execution. It has been held to be a mercantile employment, and contracts of its practitioners to be within the statute of frauds requiring them to be in writing under certain circumstances. In France it has been said to be an art, and dentists as modelers have been classed as artists in a humble way. Curiously enough, Griswold, whose case was carried to the Court of Appeals, classed himself as a "facial artist." It has been graded with truss-making and midwifery. Even persons otherwise intelligent have believed, as many still believe, that any person able to extract or fill a tooth or make a set of artificial teeth is a fully equipped dentist. The practice was formerly in the hands of blacksmiths and barbers, and we yet find among our immigrants that barbers are resorted to for extraction of teeth or alleviation of toothache.

That dentistry remained so long in this low estate was largely due to its practitioners. Not only has vulgar advertising by the exhibition of showcases and like means tended to hinder the recognition of our profession as a specialty of medicine in the large sense, as is rhinology, laryngology, otology, or ophthalmology, each of which treats an organ lying near the oral cavity and affected by its conditions, but leading members of our profession have stoutly contended that dentistry is absolutely distinct and apart from medicine. This is not the time to discuss that opinion. But so much is there in a name that, were dentistry known as stomatology, laymen, at least, would class it with the other medical "ologies." Some courts have distinctly classed dentists as medical men. And it is obvious that in so far as they adopt systemic and operative treatment, they are acting as physicians or surgeons. The borderline cannot be marked other than by the statutory definition.

Physicians have been held by the courts in some jurisdictions to be authorized to extract teeth as part of their professional work; to what extent dentists may operate they have not distinctly defined. But in a North Carolina case some years ago the question of whether or not a dentist was a physician was decided upon facts not creditable to the member of our profession concerned. Under the law of that state whisky could be sold by drug-

gists only upon a physician's prescription. A dentist prescribed a quart for a friend as a remedy for toothache, signing his prescription Dr. So-and-so. The druggist making the sale defended the suit on the ground that it was made on a doctor's prescription, but the court held that a dentist was not a physician, and added that this was fortunate, inasmuch as if dentists could prescribe a quart of whisky for one aching tooth, North Carolina would soon be in a bad way considering that there are thirty-two teeth in the human mouth. It was a poor exhibition of judicial humor, but the facts were serious, doing appreciable harm to the offender's profession.

There were able practitioners, skilful with their hands and scientific in their treatment before any law regulating the practice of dentistry was enacted. Natural talents and aptitudes will always assert themselves, but the proposition that the average man needs methodical training and education to fit him for his work scarcely seems to admit of argument. Yet it has not always been easy to assert this simple truth against ignorance and prejudice.

ORGANIZATION OF THE STATE SOCIETY.

When this society was organized the study of dentistry was carried on for the most part under private preceptorship, and the standard of instruction necessarily varied according to the competence and conscience of the individual instructors. The New York College of Dentistry, incorporated by Chap. 264 of the laws of 1865, was then the leading dental college of the state, if not of the country. It conferred its degree after a four months' course. In 1852 the New York College of Dental Surgery had been incorporated, but it graduated only one student, our colleague Dr. E. A. Bogue, and became moribund. An effort to revive it, even with such men as Abram S. Hewitt and General George B. McClellan upon its board of trustees, failed. Today, under its revived charter, it flourishes as the College of Dental and Oral Surgery of New York, requiring a four years' course of nine months in each calendar year.

Medical practice was also in 1868 substantially free to all. Injudicious enforcement of the medical laws that had been put upon the statute-book in the eighteenth century and amended by degrees had led to their repeal—in fact if not in name—by the law of 1842, making unlicensed practice a misdemeamor only in cases of injury from malpractice. The college courses were short, not only in this state but elsewhere; nominally two years, often completed in less time. The degree of M.D. was conferred with what today would be deemed recklessness in a dental college. It is to the credit of the Woman's College of the New York Infirmary that it was the first to exact a three-year course of study, and when Harvard, about the year 1870, made the same requirement, the number of its students fell from a large number to about half a dozen, only to increase rapidly when students seeking medical education rather than a mere medical degree flocked to the school where that education was given.

THE FIRST DENTAL LAW OF THE STATE.

It was from appreciation of these conditions and the incident evils, both to the people at large and to the profession, that this organization came into being under Chap. 152 of the laws of 1868, entitled "An Act to Incorporate Dental Societies for the purpose of Improving and Regulating the Practice of Dentistry in this State." Those were the purposes of our incorporation—to improve the practice and to regulate it. Certainly those purposes have been accomplished; slowly, painfully, step by step, against opposition from many quarters inside as well as outside of our ranks, and not without criticism, some of it made in good faith, more out of ignorance, much out of malice.

But the result has crowned the work. The standard of education has been advanced. The meager course of four months' perfunctory study of regional anatomy, materia medica and therapeu-

tics, chemistry, physiology, covering digestion and circulation, and prosthetic dentistry, has been enlarged to a course covering four years. Preliminary education of students, at least to the extent of a high-school course, has become a requirement of admission to the colleges, which are equipped for their work to a degree undreamed of in time past. Clinical instruction and laboratories for chemical, physiological, histological, bacteriological and prosthetic work are provided. Under the statute, illegal practice, the sale of diplomas, false personation, and other frauds are punished.

By abolishing the diploma standard of license and requiring graduates of colleges to pass examinations before a state board a certain uniformity of license has been attained, and the diplomas formerly issued as articles of commerce by the so-called "diploma mills" have ceased to have value in this state. That all the evils against which our faces were set have been abolished it would be foolish to contend; but they have been lessened. If the law has failed to punish every offender—and all laws must so fail—it has been nevertheless a schoolmaster bringing both laymen and practitioners to a higher appreciation of ideal conditions. Law alone cannot, unless sustained by public opinion, regulate conduct.

The illegal practice of a profession is what is called *malum prohibitum*—it is wrong, that is to say, only because it is forbidden. Crimes that are *mala per se*, that is to say, against the common sentiment of mankind—murder, theft, and other acts originating in evil intent—are and always have been committed in greater or less degree despite laws directed against them. How, then, can one expect to prevent entirely the commission of acts which do not necessarily involve evil intent, but which in the absence of statutory prohibition are perfectly lawful and even commendable.

When Dr. Lorenz of Vienna came to this country to demonstrate his bloodless operation on the hip joint, he was technically violating the law, inasmuch as he was not licensed. He was nevertheless invited to make the demonstration at Bellevue and Cornell. There were those, however, who felt incensed because he was not arrested, and in Chicago he was actually required to take out a license, perfunctorily granted, before being allowed to give a demonstration—a perfect example of the fact that it is the spirit that keeps the law alive and the letter that kills it. It is this narrow spirit, the spirit of small jealousy, in most instances animated by desire for personal gain or professional aggrandizement, that caused the medical laws in England and in this country to fall into disuse.

Both medical and dental legislation are enacted under the police power of the state, primarily for the protection of the people and the common welfare against harm resulting from ignorance and unskilfulness on the part of those from whom the common law requires knowledge and skill. Secondarily, such legislation may operate for the advantage of the licensed calling, but that is not the ground upon which courts sustain it, and in the enforcement of legislation by the Law Committee of this society, that truth has been kept in view. The spirit of the law has been recognized, and out of that recognition has grown most of the criticisms directed against those charged with the statute's enforcement. It is also because of that recognition that we have been able by degrees to enlarge the scope of the law.

THE EFFECT OF THE DENTAL LAWS UPON DENTAL EDUCATION.

It has been said already that your patience would be exhausted by a detailed recital of the work achieved by the society. Since its organization, twenty-two acts of the Legislature bearing upon dental practice have been passed, some of them being consolidations of work already accomplished. A number of proposed enactments intended to benefit individuals and lower the standard established have been defeated by constant vigilance. The constitutionality of the law as formulated by the society has been sustained in the case of Griswold already referred

to, which was obstinately contested in all our courts until his conviction in the New York Special Sessions was finally affirmed by the Court of Appeals.

The law of 1868 authorized dentists in the eight judicial districts of the state to convene on the first Monday of June in that year, in number not less than fifteen, at specified places, to elect officers, and when organized to choose eight delegates to meet in Albany on the last Tuesday of that month, and, if the delegates were not less than thirty-three in number, to organize the Dental Society of the State of New York. It provided for the appointment of censors by each district society, whose duty should be carefully to inquire into the qualifications of all persons who should present themselves within the districts where they resided for examination, and report their opinion in writing to the president of said district society, who in turn was required to issue to persons recommended by the censors a certificate of qualification, countersigned by the secretary, and under the society's seal. It also authorized the State Society to constitute a state board of eight censors, one from each district, to examine all persons entitled to examination under the act and presenting themselves therefor. Upon the recommendation of this board, it was the president's duty to issue a diploma under the society's seal and countersigned by the secretary.

All dentists in regular practice at the passage of the act, all having diplomas from a dental college of the state, and all students who had studied and *practiced dental surgery* with accredited dentists for a term of four years, were entitled to present themselves for this examination, and a deduction from this term, in the case of students who after the age of sixteen had pursued any of the studies usual in the colleges of the United States, was made for the time they had pursued such studies, not exceeding one year. A deduction of one year was also made in the case of a student who had attended a complete course of lectures in any incorporated dental or medical college in the United States.

By Chap. 331 of the laws of 1870, this diploma of the society was made to confer the degree of Master of Dental Surgery. It was made unlawful for any other society, college, or corporation to grant the said degree, and anyone falsely pretending to hold the certificate, license, diploma, or degree from the state or district society, or to be a graduate of an incorporated dental college, with intent to deceive the public, was made guilty of a misdemeanor.

In 1901 it was provided by Chap. 215 of the laws of that year that no dental degree should be conferred in this state except Doctor of Dental Surgery, the Board of Regents being authorized to confer this latter degree upon those already holding this society's degree of Master. There was opposition to this change of the law, very warmly urged by some whose opinion was entitled to weight, but the majority in favor of it was large.

No law is of great value that does not have a sanction, that is to say, does not provide adequate punishment for its violation. This the law of 1868 failed to do. It did, however, contain the provision that this society should be entitled to all the privileges and immunities granted to the Medical Society of the state, which, literally construed, would have entitled us to grant medical diplomas. No one was obliged to submit himself to examination, no license to practice was required, and consequently no penalty for unlicensed practice could be imposed. The great result of the statute was the creation of state and district societies, whose persistent efforts for the betterment of the law have educated slowly both the profession and the public to a realization of what the qualifications of a dentist should be. The barriers to advancement have been gradually overcome. With the law's amendment, and, as we believe, in part at least on account of it, the standard of education has been advanced, and that advance has been reflected in the papers read before the society, which, dealing at first with strictly technical and practical matters of technique, or with general exhortations di-

rected to the improvement of the profession, have been increasingly scientific in their nature.

In 1877 and 1878 strenuous efforts were made to obtain a law requiring the diploma of a college or of the State Society as a prerequisite to license. But the proposed measure met strong opposition, especially from Brooklyn, and was defeated. Its opponents urged that the measure would deprive practitioners of their livelihood, that the diploma was a fetish, importing no special skill and knowledge, and that the school of experience was the best educator. In the following year, however, this step in advance was made by Chap. 540 of the laws of 1879, a short act declaring it a misdemeanor for anyone to practice dentistry for fee or reward without a diploma from the society or an incorporated college recognized by the society, violations of the law to be punished by a fine of not less than $50 or more than $200. It was provided, however, that nothing in the act should apply to persons engaged in practice at the time of its passage. This also met the objection that the law would deprive men of their livelihood. The other step in advance made by this law was a requirement that within sixty days from its passage every practitioner should register in the office of the clerk of his county. Thus, after the lapse of eleven years from its organization, the society obtained the requirements of license and registration such as they were. Many, however, failed to register, and two years afterward, in 1881, an act was passed extending the time of registration. The enforcement of the law was at first intrusted to special committees appointed annually, and without resources.

In 1875 Dr. C. A. Marvin, from the committee appointed to prosecute violations of the state law, made a verbal report that no action had been taken, and a resolution was adopted to refer that report to the same committee, and to give them a year's longer time for prosecution. In the following year that committee—Drs. Marvin, Austin, and Harvey—reported that only one case of violation of the law had been brought to their notice; that as the person alluded to had died, no action had been found necessary, and that it was hoped that no need of any further appointment could be found to exist. In the following year another special committee upon the amendment of the dental law, composed of Drs. Francis, Hill, and Daboll, reported a short act prohibiting practice by any person not having received a diploma from some incorporated college or the State Society. The report was adopted and nothing more done.

APPOINTMENT OF A PERMANENT COMMITTEE ON DENTAL LAW.

A special committee was again appointed, with like meager results, and in 1883 a permanent committee on dental law was created, which in the following year reported that although it had been notified of its appointment, it had received no definite instructions as to procedure, whether to await charges from a district society or to proceed upon its own initiative. It did report, however, action upon various cases, in none of which were legal proceedings instituted. In the following year, 1885, this committee reported their efforts in a number of cases, and concluded by suggesting that the committee be allowed to employ counsel, and this they did in the year 1888.

From that time on, prosecutions were steadily conducted, with the result that in some years conviction was obtained in every case tried, and out of the hundreds of prosecutions convictions have been obtained, so far as I have been able to estimate, in over 90 per cent. A few civil cases also arose. The first was a mandamus proceeding by one White to compel the writer as a member of the State Board of Censors to issue a certificate allowing the relator to register as having been engaged in practice prior to 1879. In that year he had attained the mature age of fourteen years, and the application was denied. Actions also for false arrest or malicious prosecution were brought and defeated. Constant efforts were made to extend and enlarge the so-

called student clause allowing persons under the instruction of preceptors prior to the licensing act to be admitted to examination without other qualification. All these attempts were defeated, and the clause finally eliminated.

It was found that while prosecutions in the county of New York—which after the first few years were tried in the Court of Special Sessions, composed of three justices—were almost invariably successful, it was extremely difficult to procure convictions in other parts of the state. Two typical cases illustrated this difficulty. Complaint was made of one B., of H. county. He was unregistered and unlicensed. He had left Massachusetts under a cloud. He falsely qualified as an expert in an assault case, testifying that he could tell from the appearance of the alveolar process whether a tooth had been pushed in or pulled out. The action in which he so testified was founded on a woman's complaint that her brother-in-law had knocked her tooth down her throat, and the brother-in-law's defence was that in trying to protect himself from her assault his finger got into her mouth, and in pulling it out he had extracted the tooth.

The case against B. was sent three times to the grand jury. Its members being friendly to the accused sent for him, and discussed the constitutionality of the law. Mr. Justice Kennedy of the Supreme Court on the third occasion instructed the grand jury that their duty was to pass upon the facts, and that they had nothing to do with the constitutionality of the law. Finally B. died. The whole matter turned largely upon the unpopularity of the complainant, who had been an expert in the assault case in opposition to B. Feeling ran so high that a local newspaper said editorially that while of course B. was technically guilty, no grand jury in the vicinity would indict him.

Another case in Warsaw showed the influence of local feeling. Two licensed dentists went there to practice. They complained that a practitioner, a native of the place, was unlicensed. The grand jury sent for the book of registry, and finding that neither the complainants nor the accused were registered promptly indicted the complainants, but refused to indict the equally guilty accused. These examples are only some of many.

The society's prosecutions of corporations were also successful. It may be considered the settled law of this state that corporations cannot practice law, medicine, or dentistry, or it might have been so considered prior to the passage of the dental act now in force, which, contrary to these decisions by the courts, allows corporations practicing dentistry prior to its enactment to continue in practice, although the practice of law and medicine, implying personal relation between the practitioner and his client or patient, is confined to individuals.

Throughout the time during which the society has endeavored to enforce the law, it has labored under the disadvantage of insufficient funds. Under the original acts of Legislature the fines were given to the public-school fund. As there were no prosecutions, that fund did not benefit. By amendment, only the excess of receipts from fines over cost of prosecution was to be so disposed of, and as there was no such excess, again the school fund reaped no harvest. Eventually all fines were given to the society, but never did they cover the cost of prosecution. So also the excess of fees for examination over cost was given to the society. The cost of prosecution in no year has been equal to the salary of a deputy district attorney in New York, while societies for the Prevention of Cruelty to Children and of Animals, aided by individual subscriptions and large endowment funds have had incomes amounting to as much as $100,000 a year.

Under the law of 1916, prosecutions are now required to be initiated by complaints to the Regents under oath or sustained by other satisfactory evidence. If upon investigation they are found to be true the Regents refer the complaints to the Attorney-general for prosecution, the fines being given to the State Board of Dental Examiners. Annual registration

is now required. The advocates of this change of the law argued that out of the receipts from this source a large fund would be annually available for prosecutions. What the results will be remains to be seen; it is hoped that they will be commensurate with the increased resources.

Apropos of the criticisms made of the society's prosecutions, it should be mentioned that they emanated largely from members of the Eastern Dental Society of New York and of the Allied Dental Council, and were spread by their organ. The Dental Council employed as its agent one M., who had been employed for a few weeks by the Second District Society, and subsequently by the Law Committee of the State Society, upon representations that he knew of some 360 unlicensed dentists. He failed to give their names; his methods were unsatisfactory, and he was discharged. Thereafter he was employed by one R., twice convicted on the society's complaint, and as he admitted on the witness stand, was desirous of "getting even."

M. circulated defamatory stories attributing "grafting," as it is called, not only to former agents, but to the chairman of your committee and its counsel, representing them to have collected enormous sums from unlicensed practitioners. He included in his stories the offices of district attorneys of New York and Kings counties, which he said were controlled by your counsel, a judge on the bench, and others. Charges were preferred against him to the Comptroller of the state. Every opportunity was given him to substantiate his statements, and his license as a detective was revoked. The deputy state comptroller, who heard the charges, in a written opinion found them to be groundless. He, M., sued out a writ of certiorari to review this finding, and the appellate division of the Third department, after hearing arguments upon a voluminous record of over a thousand pages, unanimously ordered dismissal of the writ with costs against M., and thereafter denied his application or appeal to the Court of Appeals.

In the course of that hearing it transpired on the cross-examination of Dr. R., a witness for M., that he had given a certificate to the Regents of good character for one M. G., also a witness for M. This man had previously testified in defense of one DeL., who had been twice convicted by the State Society, and again prosecuted by the Allied Council. G. having testified that he had done the work that DeL. was charged with doing, after an interview with Dr. R. made affidavits that his testimony was false; in one way or the other he had sworn falsely. Dr. R. admitted that he communicated with G. in the course of the last prosecution, and had known him only a few months. Nevertheless he subsequently certified to the Regents that he had known him three years, and believed him to be of good character and worthy of admission to the dental profession. Charges were preferred against him before the state board, and after a hearing he was suspended from practice for a year. The Regents confirmed this finding. He also sued out a writ of certiorari and the appellate division dismissed his writ with costs.

These prosecutions necessarily affected the Law Committee of the society, and reflected upon the society itself. They consumed months of time and involved much labor on the part of counsel who conducted the prosecution, but no compensation has been received by him, and his disbursements incident to attending the sittings of the court in Saratoga and Albany have not been repaid.

The law as it exists is not perfect. It is the result, as so many laws must be, of compromises, such as permitting corporations to practice dentistry, despite the rulings of the courts. But it is hoped that before the centennial of the society arrives, the educational advance in the profession will be as great commensurately as it has been in the past—that the law will be perfected and made a simpler statute, and that dentists will have achieved their true position as prac-

titioners in a special field of medicine and surgery. Until that condition has been brought about, the question will always arise whether operations properly within his scope constitute practice of medicine and violations of the medical law.

560 Fifth ave.

The Conversion of India Rubber into Vulcanite.

By GEO. B. SNOW, D.D.S., Long Beach, Cal.

THE fact is well known that caoutchouc or India rubber, when mixed with a certain quantity of sulfur and exposed to heat, turns into a hard, hornlike substance, totally unlike the compound from which it was formed, which is known as vulcanite. The use of this substance in dentistry is universal, by far the greater proportion of artificial dentures being composed of vulcanite as a base. Although the material is easily worked and the results obtained with it are fairly satisfactory, the artificial dentures produced usually contain defects which are sometimes imperceptible, but which nevertheless exist. These come from a lack of knowledge of the phenomena attendant upon the hardening of the rubber compound by its exposure to heat, the substance being so easily worked that any inquiry into the phenomena attendant upon vulcanization is usually thought to be unnecessary.

About forty years ago the attention of the writer was directed to this subject by some remarkable statements given out by Dr. Seabury in his promotion of a rather peculiar form of vulcanizer which he was then introducing, and which is now almost forgotten. Some of these statements ran counter to the writer's experience, and induced him to experiment for the purpose of ascertaining their truth or inaccuracy.

One of these strange assertions was to the effect that the sudden application of steam pressure to the rubber compound would prevent the occurrence of spongy rubber, the pressure advocated being as high as 120 pounds to the inch, which pressure corresponds to a temperature of 350° F. Experiments showed this statement to be fallacious. In conducting them, pieces of considerable thickness, with flat sides, were vulcanized, and it was found that when a temperature was employed which produced a mass that was solid to the center, the sides of the piece were invariably concave. And upon taking the specific gravity of one of these pieces and comparing it with that of the unvulcanized gum, there was found to be a decided increase in this respect in the vulcanized piece. It was thought best to go farther with these experiments, and a metal mold was designed consisting of a flat plate of brass which would produce a flat circular mass a quarter of an inch in thickness and a little more than one and three-quarter inches in diameter, a smaller cavity being provided and connected with the mold by a narrow passage, to receive the rubber which would be expelled from the mold as its contents expanded by heat. This smaller cavity is called the overflow chamber, and the rubber which escapes into it is known as the overflow. A flat plate on each side of this central piece completed the mold, the parts being clamped firmly together with bolts.

EXPERIMENTS IN VULCANIZING RUBBER.

In performing the experiments the mold was packed full of rubber com-

pound, closed by bolting its parts together, and then boiled. The expansion of the rubber when heated expelled a small quantity of it into the overflow chamber. This overflow was removed, the amount of rubber remaining in the mold being then sufficient to completely fill it at the temperature of boiling water. This mass of rubber was then removed from the mold, weighed, and its specific gravity taken, again inclosed in the mold, and vulcanized. It was then again weighed, including what had escaped into the overflow chamber during vulcanization, and its specific gravity again taken. The overflow was then weighed separately.

It was found that the sides of the flat circular piece thus produced were invariably more or less concave, and the specific gravity of the mass was considerably increased by vulcanization. It was also found that the diminution in bulk of the mass as shown by the concavity was nearly equal to the bulk of the overflow, so that the mass which was contained in the large chamber of the mold was diminished in its bulk, first, by its shrinkage in vulcanizing, and again by the expulsion of a part of the contents of the mold into the overflow chamber. Taken together, the diminution in bulk of the piece of vulcanite remaining in the mold was found to equal from 4 to about 9 per cent., depending upon the amount of foreign matter incorporated in the rubber compound.

The results of some of these experiments have been tabulated for inspection. (See Table on following page.) A wide difference is seen in the figures for pink rubber, which has in its composition an excessive amount of coloring matter, as compared with the base-plate rubber. It shows less expansion by heat, and less shrinkage, the base-plate rubbers varying in these respects according to their color, the darker ones showing more expansion and shrinkage and the lighter ones less. The diminution in bulk varied from a little over 2 per cent. for pink rubber to over 9 per cent. for a sample of black rubber compound.

The diminution in bulk consequent upon vulcanizing rubber is the result of two causes: (1) Its shrinkage, which is a permanent molecular change involving an increase in specific gravity, and (2) its contraction by cooling, a property which is possessed by vulcanite to a very marked degree, as it expands by heat and contracts by cold much more than any other solid substance. The distinction between the two words, shrinkage and contraction, should be kept in mind, as shrinkage refers to a permanent molecular change, while the change denoted by the word contraction is of a temporary nature, being the opposite of expansion, either being produced at will by a change in the temperature of the mass.

These facts account for the troubles encountered by dentists in their vulcanite work. If the vulcanizing is done, as it usually is, in a flask which is completely closed before it is placed in the vulcanizer, its parts being rigidly held together by bolts, it is necessary to cut escape gates for the reception of the overflow rubber as it escapes from the mold when it is heated, and it is apparent from what has been said that when the vulcanizing process is completed there will be a deficiency of vulcanite in the denture, the result not only of the shrinkage of the gum in vulcanizing, but also of the expulsion of a part of the rubber compound into the escape gates as it is heated to the vulcanizing point. There must, then, be a surplus of rubber compound, *i.e.* more than the mold will hold when closed, at the beginning of the process, and the closure of the mold must be effected gradually as vulcanization proceeds, and as the mass grows smaller by its shrinkage.

By vulcanizing samples at the same temperature and at different times, increasing the time gradually from ten minutes at the start by short intervals to the full time for vulcanization, and afterward taking the specific gravity of the samples, it was found that shrinkage takes place more rapidly during the first half of the vulcanizing process than thereafter. It follows, then, that if the flask is completely closed when it is placed in the vulcanizer, the vulcanizing

TABLE SHOWING THE BEHAVIOR OF DIFFERENT RUBBER COMPOUNDS IN VULCANIZING.

—	Weight, unvulcanized.	Weight in water, unvulcanized.	Displacement in grams and cc.	Specific gravity, unvulcanized.	Weight, vulcanized.	Weight in water, vulcanized.	Displacement in grams and cc.	Specific gravity, vulcanized.	Shrinkage, cc.	Percentage of shrinkage.	Overflow, weight.	Overflow, bulk, cc.	Deficiency in bulk, cc.	Percentage of deficiency, bulk.
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*
McCormick:														
Light pink	28.247	17.872	10.375	2.723	28.240	18.197	10.043	2.812	.332	.032	.865	.308	.640	.062
Ordinary black	11.380	1.155	10.225	1.113	11.393	1.678	9.715	1.173	.510	.050	.625	.533	1.043	.102
Maroon	17.235	6.965	10.270	1.678	17.263	7.502	9.761	1.768	.509	.049	.891	.503	1.012	.099
Light red	17.321	7.009	10.312	1.680	17.347	7.478	9.869	1.758	.443	.042	.876	.498	.941	.091
S. S. White:														
Maroon	18.165	7.912	10.253	1.771	18.18	8.38	9.8	1.845	.453	.044	.708	.384	.837	.082
Gold base	16.417	6.091	10.326	1.589	16.437	6.539	9.898	1.66	.428	.041	.633	.381	.809	.078
No. 1 red	21.595	11.302	10.293	2.098	21.602	11.725	9.877	2.187	.416	.040	1.036	.474	.890	.086
Doherty:														
Maroon	15.821	5.526	10.295	1.538	15.837	6.040	9.797	1.616	.498	.048	.924	.572	1.070	.104
No. 1 red	17.368	7.162	10.206	1.702	17.379	7.627	9.752	1.782	.454	.044	.802	.450	.904	.089
Samson	14.545	4.34	10.205	1.425	14.569	4.864	9.705	1.501	.500	.049	.792	.528	1.028	.101
Traun:														
Gold dust	11.498	1.272	10.226	1.124	11.517	1.764	9.753	1.181	.473	.046	.582	.493	.966	.094
Ash:														
Dark elastic	13.200	2.730	10.470	1.261	13.220	3.547	9.673	1.366	.797	.076	.579	.424	1.221	.117

process will not have progressed very far before sufficient shrinkage of the rubber will have taken place so that it will no longer completely fill the mold. It will adhere to the plaster surfaces and will in consequence leave the smoother and more dense surfaces of the teeth and tooth-pins, the result being that the teeth are insecurely held upon the plate, often loosening after a short time of use. At times the vulcanite will be found to have drawn away from the overhanging shoulders of the bicuspids and molars, and again there will be pockets formed by the separation of the vulcanite from the teeth, which allow the intrusion of mucus and particles of food which decay and render the denture unsanitary. This condition was more noticeable in former days, when gum section teeth were employed, but it is still present in most of the artificial dentures.

Explanation of the Table.

All weights in the Table are in grams. All bulks in cubic centimeters.

All samples were vulcanized at 75 lb. by the steam gage, it being the same as 300° F. by the mercury bath thermometer, or 320° actual temperature.

Columns *3* and *7* show the weight and also the bulk of water equivalent to the respective samples—as a cubic centimeter of water weighs 1 gram.

All the vulcanizing was done in the same brass mold, which was closed by bolts without springs, and had a gateway leading to an overflow chamber, which received the rubber expelled from the mold as it was heated from 212° F. to the vulcanizing point. Capacity of mold at 70° F., 10.710 cc.; at 212°, 10.759 cc.; at 320° (75 lb. pressure), 10.796 cc.

The discrepancies between columns *1* and *5* are due to the absorption of a small quantity of water by the rubber when vulcanizing; showing that vulcanite is slightly porous. The amount of water absorbed is about half a drop for a sheet of rubber. *Rubber compound does not lose weight by vulcanizing.*

Column *11* denotes the weight of rubber expelled from the mold as the sample is heated from 212° F. to the vulcanizing point. Column *12* shows the bulk of the same.

In column *13*, the shrinkage shown in column *9*, which is the difference between columns *3* and *7*, is added to the overflow, column *12*, and shows the total amount of deficiency of vulcanite in the mold when the vulcanizing process was completed. Column *14* gives the percentage of this deficiency. It will be noted that the deficiency is greater in the dark-colored rubbers and less in the lighter-colored ones, the light rubbers containing more foreign matter in their composition.

Conclusions.

If the flask is bolted and gateways provided for the free escape of the rubber as it is heated, the deficiencies shown in columns *13* and *14* are inevitable, and the denture will always be defective.

If spring pressure is applied to close the flask, and the rubber is confined so that none of it can escape unless the parts of the flask are separated by its expansion, the deficiency will be less than that shown in columns *13* and *14*, the amount depending upon the average thickness of rubber in the case.

To produce the best results, spring pressure must be used to close the flask, the mold must contain an excess of from 3 to 5 per cent. of rubber when vulcanizing commences, and the flask must, therefore, not be entirely closed at this time. Its closing must be effected gradually by spring pressure and after the vulcanizing process has progressed far enough to cause a partial shrinkage of the rubber. For vulcanizers of the ordinary type this may be accomplished by two vulcanizations.

THE ADVANTAGES OF SPRING PRESSURE IN VULCANIZING.

The ordinary method of vulcanizing, that is, by using rigidly bolted flasks and passages for the escape of rubber compound as it is heated, is, then, wholly and entirely wrong. If escape passages are

not provided and the flask is rigidly bolted so that there is no vent for the rubber as it expands when heated, it will exert sufficient pressure by its expansion to cause a yielding of the plaster mold, and to injure the fit of the denture. Some form of spring pressure should always be used upon the flasks in vulcanizing artificial dentures, allowing them to open slightly and yield to the pressure of the expanding rubber as the case is heated, and the pressure should be sufficient to close the flask upon the rubber as it shrinks during vulcanization.

Many dentists are aware of the benefits arising from the use of spring pressure upon the flask when vulcanization is going on, but very few use it in a way to gain all the advantages to be derived from it. This is an easy matter if the case presents a large area, and requires only a small quantity of rubber compound in its construction. If all the plaster is removed from one of the parting surfaces of the flask, except a very narrow margin next the mold, it is evident that there will be no escape for the rubber until after its expansion has slightly separated the halves of the flask; but when this occurs the capacity of the mold is increased, and a certain quantity of surplus rubber will be retained in it, which will compensate for the shrinkage of the mass, provided the shrinkage is not too great. If the average thickness of the denture is not over a twelfth of an inch the results obtained will be very satisfactory, but with a greater average thickness the amount of rubber retained by the opening of the mold by its expansion will be insufficient. Rubber compound flows with difficulty through a very narrow passage, and very little of it will pass if the sections of the flask are separated less than a hundredth of an inch. A considerable escape will ensue, however, if the separation is twice that amount.

For dentures having a greater average thickness and requiring a greater quantity of rubber compound in their construction it becomes necessary to prevent the complete closure of the flask until after the rubber is partly vulcanized. With the ordinary vulcanizer this will require two separate vulcanizations, the first, for somewhat less than half of the requisite time, with the flask held open by props sufficiently to allow the retention of a certain amount of surplus rubber, dependent upon the case; the second with the props removed, and the spring pressure exerted to close the flask and mold the rubber as the process of shrinkage goes on. But few dentists will go to the trouble involved in this double vulcanization, although when it is expertly performed excellent results may be obtained.

An alternative is the use of a vulcanizer so constructed that the flask may be closed in its interior, and while the vulcanizing process is going on. With such a vulcanizer the dentist has the time for closing the flask and the pressure to be exerted upon it entirely within his control, and the results will accordingly be very satisfactory.

EXPANSION AND CONTRACTION OF VULCANITE.

Vulcanite when heated expands much more rapidly than other solid substances. The figures which are available in the textbooks give the rate of expansion for only a small range of temperature, not exceeding 100° F. It is impossible to measure the rate of expansion accurately for temperatures very much above the boiling-point of water, as the samples shrink perceptibly when so heated. It is believed, however, that the rate of expansion will increase to a certain extent with the temperature to which the sample is exposed, and that it will also vary according to the composition of the vulcanite. A sample composed of pure rubber and sulfur will expand more when subjected to a certain heat than will one of which extraneous substances form a part. That is to say, pink vulcanite will expand less than the ordinary colored base rubbers, and these in turn less than a sample of pure rubber and sulfur.

There is difference enough in the rates of expansion of pink and colored base-plate rubbers to be taken into account in the construction of artificial dentures. If only a thin layer of the pink vulcanite is used to cover the base-plate gum, the

latter extending over the buccal and labial faces of the plate, the influence is not marked; but when the whole labial portion of the plate is of pink vulcanite, the plate will often be found to be warped. It will be too narrow at the extreme rear and too high in the palatal vault, and when placed in the mouth it will be found to rock and to have little or no adhesion; when worn it will be very apt to chafe and irritate the buccal surface of the gum.

When vulcanite is at a temperature at or near the boiling-point of water it becomes very flexible, and when bent and cooled it retains whatever shape may be given it; and if it is stretched when heated and cooled under tension, it will remain elongated when cool. A strip of vulcanite composed of a layer each of pink and black or red rubbers, and vulcanized between flat plates of metal, will when cool show some curvature, the hollow side being toward the base rubber. If the strip is dipped into boiling water it will when cool show very much more curvature than it did before.

A vulcanite denture is molded upon its plaster cast, and as it is expected to retain the shape and contour of the cast upon which it is molded, it should be allowed to remain in the flask until it is cold before the flask is opened, the vulcanite being held to the cast while cooling. It is under a certain amount of tension, which is relieved if the plate is subjected to a temperature high enough to soften it, the amount of change depending upon the temperature employed. Dr. Stewart J. Spence of Chattanooga, Tenn., has taken advantage of this fact. By dipping some of his dentures in water heated to 130° F. or more he found that when the denture had cooled it was perceptibly smaller; and by carefully managing the temperature of the water he was able to improve the fit of the plates.

If, after vulcanizing, the flask is opened while hot, the palatal portion of an upper plate will cool more rapidly than will that portion overlying the alveolar ridge, and because of the fact that one part contracts, as it cools, before the other, there will be a tendency to warpage of the plate.

SPONGY VULCANITE.

In the prosecution of these experiments, an attempt was made to compare the behavior of the rubber samples when vulcanized at different temperatures, all being vulcanized in the same mold—one lot at 320° F. actual temperature or 300° by the mercury bath thermometer, the other at 320° by the mercury bath thermometer or 340° actual temperature. The results of these experiments were unsatisfactory, and it was found that the disks vulcanized at the higher temperature were slightly spongy in the center. Of course they showed less concavity than if they had been solid, and were not available for the purpose of taking the specific gravity of the product.

As many artificial dentures, especially those for the lower jaw, have places in them a quarter of an inch thick, it follows that they should be vulcanized at a lower temperature than 320° by the mercury bath thermometer. Vulcanite turned out at this higher temperature is not so strong and tough as that vulcanized at a lower heat, and in case of repeated repairs, which are sometimes necessary, the vulcanite will be found to have lost a great part of its strength from the successive exposures to this high temperature. It may be laid down as a rule that better work will be done if it is done at a temperature not exceeding 300° by the mercury bath thermometer or 320° actual temperature. Of course more time is consumed in vulcanizing, but in these days, when heat regulators are almost universally employed to time the vulcanizer when in use, the extra time consumed is a small matter.

The occurrence of spongy vulcanite is always an indication that an excessive temperature has been employed in the vulcanizing process, and it will be better to lower it 15° or more, according to the thickness of the piece to be vulcanized. A slow raising of the temperature in coming to the vulcanizing point is recommended, but if the vulcanizing point is set low enough this will not be necessary, nor will the aggregate time employed in the vulcanizing process be increased.

To produce a thoroughly satisfactory and sanitary vulcanite denture, the vulcanizing process must be so conducted that there will be a constant pressure brought to bear upon the rubber as it vulcanizes, a sufficient quantity of it being present to insure the filling of the mold at the termination of the process, and to compensate for the shrinkage which inevitably occurs during the conversion of rubber compound of any kind into vulcanite. The pressure must be gradual and firm, and sufficient in amount to force the rubber against the surfaces of the mold and teeth, and hold it in intimate contact therewith.

The vulcanizing temperature should not be above 300° by the mercury bath thermometer, this being 320° actual temperature; or if a thick mass of rubber must be vulcanized the temperature should be still lower. Rubber can be well vulcanized at a temperature as low as 265° as shown by the mercury bath thermometer. A flask should be allowed to cool very gradually, and should not be opened until it is at room temperature.

231 Kennebec ave.

Dentistry After the War: A Promising Professional Field for Young Men.

By EDWIN N. KENT, D.M.D., Boston, Mass.,

PRESIDENT DENTAL HYGIENE COUNCIL OF MASSACHUSETTS; DIRECTOR OF EXTENSION LECTURES, NATIONAL MOUTH HYGIENE ASSOCIATION.

THE industrial readjustment which will follow the present war will affect nearly all vocations to some extent for better or worse. The changed conditions will have the most marked influence on pursuits connected with manufacturing interests, and least in the professional fields.

One profession, however, will reap the benefits of a greatly increased demand, a demand which its present members must fall far short of meeting. Dentists may look forward to a season of unusual prosperity.

The cause is simply a matter of education. At the outbreak of the war the registered dentists in this country could properly care for but twenty million patients. Eighty per cent. of our people did not patronize dentists except for emergency service; did not demand proper dental treatment.

The situation was due, to some extent, to the expense of dental service, but it was due to a much greater extent to the fact that a large majority of individuals have not realized or appreciated the value of a clean, unimpaired, healthy masticating organ in connection with the maintenance of systemic health.

The requirements of the present war have placed representatives from several million American households where they will live under rules and restrictions designed to build up strong bodies and develop physical efficiency. Compulsory dental service and education on the subject of mouth hygiene in the army and navy will impress upon enlisted men the importance of the dangers lurking in an unhealthy mouth, the functional inefficiency of a crippled grinding machine which cannot properly prepare food for the stomach, and the physically weakening influence of mouth neglect.

A large proportion of the eighty per cent. who were ignorant on the subject before they entered government service

will, on their return to civil life, continue to follow those habits of mouth cleanliness and care which they have been compelled to adopt, and this will necessitate regular visits to the dentist. A secondary result will come as the new idea is carried to several million American homes, where it will, in most instances, produce favorable results among other members of the family.

The present war furnishes, undoubtedly, the greatest opportunity that ever came to the dental profession to extend its field and its influence on public health.

Full advantage of the great opportunity will not be taken unless there are changes in Washington which cannot be reckoned on in the near future, but in spite of all obstacles, intentional or accidental, many millions of American people will be awakened during and after the war to a realization of the value of a healthy mouth, and with that awakening will come an unprecedented demand for dentists. To meet this demand the dental profession must recruit new members.

The practice of dentistry does not offer any great financial returns. If a man's chief ambition in life is the accumulation of wealth he will be wise to direct his efforts into other fields.

But monetary considerations are not matters of paramount importance to a man with a sufficiently broad view of life to seek, in his selection of a lifework, a field where he has easy opportunity to put more into the world than he takes out of it. If there is one great lesson to come from the present war it is a broadened knowledge among men of the "blessings of service."

Dentistry offers to the young man whose talents run somewhat in the direction of mechanics and art, whose natural desires are toward doing with his own hands the things that he plans, and who will appreciate a field ripe with opportunities for public service, an ideal vocation.

158 Newbury st.

Correspondence

"A Case of Tooth Gemination."

To the Editor of the Dental Cosmos:

Sir,—On page 330 of the April number of the Dental Cosmos appears an article under the above caption. It is stated that the gemination is of the *lower central incisors.* Unfortunately, the illustrations accompanying the article make it impossible, for one who has not himself seen the case, to determine whether the gemination is that of the *centrals.* I am inclined to think that upon careful examination it will be found that the union is with the lateral incisor of the same side, or with a supernumerary, one of the incisors having failed to erupt.

In teaching, I have always instructed my classes that such a union, across the median line, is never found.

Very truly yours,

Louis Ottofy, D.D.S., M.D.

Manila, P. I., June 13, 1918.

"Radiolucency of Chloro-percha in the Radiograph."

To the Editor of the Dental Cosmos:

Sir,—I desire to reply to the communication by Dr. Kells in the July issue of the Dental Cosmos.

I thoroughly respect the opinions and work of Dr. Kells and others who have disagreed with me in my previous findings as to the radiolucency of chloro-percha, and for that reason I have persisted in my laboratory experiments to find out wherein the difference existed.

I believe I have solved the problem, and will here so explain the result of my work that it will show we have *all* been right, yet there was one feature of the work that all of us have not known.

We will all agree that the reason for gutta-percha casting a more dense shadow than the tooth substance is due to the presence of lead oxid (PbO) in ordinary gutta-percha base-plate. This material averages about 25 to 30 per cent. of the different specimens I have examined.

I have made fresh chloroform solutions of gutta-percha base-plate, and found that the large root-canals filled as full as possible with the solution would not show in the radiograph more dense than the tooth substance. When further fillings were made from this same mix it would radiograph clearly, and continue to do so ever after.

I shall not take up your space by detailing the work necessary to prove the result, but give it to you briefly.

When the gutta-percha clippings are added to chloroform the chloroform removes from the base-plate the rubber content, allowing the lead to precipitate to the bottom of the bottle. If this is not thoroughly shaken together the lead content is so low that the resulting solution will not show more dense than the root of the tooth. If this bottle is thoroughly shaken the lead is incorporated in the mixture to such an extent that the major portion will remain in suspense, becoming a part of each root-filling. It is then possible to get a sufficient amount in the canal to make it appear filled.

Some of my co-workers in the United States have gained the idea that I think it possible to fill a root-canal with chloro-percha. On the contrary, I have proved it to be entirely impossible.

Chloro-percha when mixed to a consistence possible of introduction into a canal shrinks 12/22, therefore a root-canal filled with this solution is only 10/22, or less than one-half, filled.

I therefore take the position that no root-canal has ever been one-half filled as to bulk and space in that portion wherein the gutta-percha point did not reach.

The reason why we have had partial success with this filling in the past is twofold: First, the tendency of chloro-percha to bridge at the apex, leaving the openings caused by shrinkage farther down the canal, and second, the few cases wherein aseptic conditions have been obtained and maintained in spite of the defective chloro-percha fillings.

Yours truly,

W. Clyde Davis.

Lincoln, Nebr., July 23, 1918.

Proceedings of Societies

Dental Society of the State of New York.

Fiftieth Annual Meeting, held at Saratoga Springs, N. Y., June 13-15, 1918.

The fiftieth annual meeting of the Dental Society of the State of New York was held in the Casino, at Saratoga Springs, N. Y., on June 13, 14, and 15, 1918.

Thursday—*Morning Session.*

The meeting was called to order by the president, Dr. Amos C. Rich of Saratoga, at 11 o'clock.

The living past presidents and Fellows of the society occupied seats on the platform.

Rev. Peter A. MacDonald invoked divine blessings on the deliberations of the society.

In the unavoidable absence of the mayor, Judge McKelvie of Saratoga welcomed the society to Saratoga Springs.

Dr. A. M. Wright, Troy, N. Y., responded to the address of welcome on behalf of the society.

The vice-president, Dr. H. L. Wheeler, then took the chair, while President Rich read his annual address, as follows:

President's Address.

By Amos C. Rich, D.D.S., Saratoga Springs.

OUR FIFTIETH ANNIVERSARY.

Fifty years have passed, and the Dental Society of the State of New York stands as a monument to the memory of those devoted and loyal members of the profession who believed and worked to have it legally recognized as a profession. Among those who were active in preparation of the law, and who afterward became first president of the society, was Amos Westcott; singularly the name Amos is attached to that of the fiftieth president, but history will be unable to find any other parallel, because our first president, Amos Westcott of Syracuse, was a man renowned in his day and generation, being the man who discovered cohesive gold and the use of plaster for an impression of the mouth, thereby contributing to both operative and prosthetic dentistry. And it would seem that he was selected by the gods of destiny, as after events have proved and history hath recorded. He led and worked with a band of devoted and faithful workers, who builded the state edifice of Dentistry so well that it has stood the test of time. It seems to me superfluous that the record of our profession and of our society since its formation should be recorded in the President's address, because we shall be edified by a regularly appointed historian who is able and capable of making such a record. And further, we shall be permitted to listen to a prophet who may tell of what he can see in the future years before us as a profession.

In all probability few if any of those present at the formation thought of an anniversary meeting, much less a fiftieth celebration. But, ladies and gentlemen, we have with us today some who were

present at the birth of our society and have lived to see our profession attain its rightful status, and our society and state dental law become a criterion for others.

THE DENTAL PROFESSION AND THE WAR.

Since our last annual meeting we have a better knowledge concerning war and its awful frightfulness. We have been called upon to get closer to humanity and to help save it from becoming bestial, and before this war is over we shall be called upon to sacrifice much for humanity, victory, and peace. All in our professional work can help make men fit to fight—that life, love, and liberty may prevail. Each and every one of us may and should do his part. Some may go to the battle front, others to the camp front, others to the office front, and others can buy bonds and help our boys, Uncle Sam, and our gallant allies win the war. It is because of humanity and what we do for it that we are recognized as a profession. Our professional edifice has for its foundation humanity, otherwise we should be merely artificers or mechanicians; therefore we should do much for humanity, especially at this time, when there is such need of our services to make those who go to the front fit to do their bit. It is not enough to buy bonds of Uncle Sam; that is a mere loan, and the best investment in the world. We who stay at home, whatever the cause, must do more, we must sacrifice in some way that we may be truly patriotic. If we cannot go to the front the least we can do professionally is to sacrifice our time and fees to make someone else fit by our skill. Then shall we feel true consciousness of having done real service for the flag we all love.

When the history of the war is written dentistry will be given due credit because we helped to make our fighting forces fit to face the enemy. History will show the unselfish purpose of our profession to serve humanity. That record will be one of glorious achievement, in restoring to friends and loved ones those who in fighting for liberty and democracy have been horribly maimed and disfigured. Such scientific skill and prosthetic handiwork by dental surgeons and prosthetic artists has never previously been known or thought possible. Wonderful restorative work has been accomplished in conjunction with the plastic surgeons of the medical fraternity. It is manifest in the light of happenings of these days (quoting our lamented Dr. S. G. Perry, "In the fulfilment of our destiny, which is to be one of the most blessed because one of the most useful callings on earth") that a universal service must in the near future be an accomplished fact. As a nation we cannot go on in our present ways, knowing, as we do now, that we are not producing citizens physically nor mentally fit to fight for our rights. We face the failure side of our democracy as well as the other. We must provide ways and means to eliminate such failure. Our promiscuous population requires that drastic methods be employed to produce national and man power to protect our country, our flag, and our homes. We must not hereafter be content to ignore our failures because we are happy and prosperous as a nation. As physically perfect man power makes for victory and peace, so must the members of the fraternity of the healing art work to produce it, through universal service to humanity. Our citizens who are ignorant must be educated, that they may properly care for themselves and their families. In sequence it follows that those who are unfit to win their way, or fight to protect their country must be made so, then shall our country be better able to protect itself from those who would destroy us. Then may we eliminate disease, poverty, crime and aristocracy.

THE NEW DENTAL LAW.

The new dental law is working well, and thoroughly indicates the judgment of those responsible for its enactment. Many misgivings and much earnest solicitude was indulged in by some of our foremost thinkers concerning the provision which established dental hygienists. There is today much, and later must be more, gratification to us all that the

dental hygienists have established their worth and usefulness as shown by the records up to date. They will in the near future fill an important position in all offices where the practice is up to date, extending comfort to the patient and to the dentist under whose authority they operate. The demand for hygienists is now increasing, because they are legally recognized, and furthermore it has become evident to the busy practitioner that he can thereby be relieved of disagreeable drudgery. There is one portion of the law which should be heeded by all for the benefit of every ethical dentist, and that is the provision requesting each registered dentist to report to the secretary of the board of dental examiners the name of any person practicing dentistry who is not registered. In this connection every legally registered dentist should again read that part of the law which defines what constitutes the practice of dentistry. Please note that a sign or newspaper advertisement constitutes "holding out as practicing dentistry;" also note the provision regarding the practice of dentistry under *false* or *trade* name. Through annual registration we are able to locate every person practicing dentistry legally; that is, if everyone registered does his duty toward his fellow practitioner and himself. Remember the name of the informer is held inviolate. Information regarding illegal practitioners helps to enforce the law. All must remember that no one man can be in all parts of the state at the same time. The prosecuting officer representing the profession must have the assistance and co-operation of all.

THE PREPAREDNESS LEAGUE.

This war has driven many things from our minds, but we must continually promote and enunciate the necessity for and means to national health. Greater co-operation with and greater manifest interest in the work of the Preparedness League of American Dentists are desirable, and much greater participation in its activities. We may not all agree with the methods nor with those who are active in the work of the League, but we can and must all agree that the fundamental principles of the League's activities are sound and necessary, and furthermore, it cannot hurt but must rather amplify our usefulness as a profession. The League now has a membership of over 15,000, and has a complete organization in each state, in Alaska, and in Porto Rico. It is connected with the general medical board through a subcommittee of the committee on dentistry of that board. It has the indorsement of the Government because of its assistance through dental service to drafted men. The dental motor car of the League is probably the most perfect of its kind in the world, and is a marvel of ingenuity. Its capacity is about 100 patients a day, and its cost about $5500. The League is certainly one of the most potent unifying influences in the dental profession today. And to my mind there is no need of its work or influence being lost whenever the war shall cease; it is dedicated to the service of the greatest flag that floats.

PUBLICATION OF THE SOCIETY PROCEEDINGS.

In the interest of true professionalism I again recall to your mind the publication of our proceedings as a State Society. For some years they have been published by a trade journal at their convenience and for their advantage, because of the merit of the material produced, otherwise a trade journal would have no use for it. True, they are so published at a nominal cost; nevertheless at a high cost to us in a professional sense.

Professionally it is no incentive to members or guests who appear before us as essayists or discussers to have their efforts subjected to the whims of a trade journal editor, as to what is worthy or eligible, and likewise as to the proper time for publication. As members of a society of professional men (which means that we stand before the people better educated and worthy of trust as practitioners of our branch of the healing art) we should desire better things concerning our proceedings and their publication. We have had unnecessary and unfortunate experiences regarding this matter, and a society with fifty years of

professional and scientific work already accomplished should not relinquish control of the professional and scientific material brought before it, and for the production of which it is responsible. Our membership should not be compelled to await the disposition of a publisher as as to the proper time of publication before they can avail themselves of the professional and scientific data therein contained. We really should adopt and maintain a higher standard for the platform upon which we stand. I therefore recommend that necessary action be taken to publish our proceedings under conditions of society and professional control. Furthermore, in my humble judgment the dental profession must soon assume an advanced position as regards publicity of professional knowledge for the benefit of the people. Our State Society as the representative authority of the dental profession in the state should be responsible for the better education of the people concerning dentistry. It should not be left to any unauthorized person to go before the people to give publicity to his personal views as to what is best procedure in dentistry. I sincerely hope this society will give this matter sincere and careful thought and study, to the end that we may in the near future have a real publicity department.

MEMBERSHIP.

It is wise to take a perspective view of ourselves at times, and with that in mind let us investigate our membership. Today there are about 5600 practitioners of dentistry within our state, and as our total membership is only 1400 we do not numerically represent our profession. In numbers there is strength. We should be a strong society in that sense. Legally we are strong. We, as a profession in this state, could do great things with large increase in membership and the consequent increase in financial help. With the assistance of the published list of registered dentists in the state issued each year according to law, the members of our State and district societies can with little effort eliminate from the registry list all but the ethical practitioners; then, by comparison of the ethical with the membership lists, the eligible dentists could be listed and a great increase in membership could be accomplished by systematic work through energetic committees. It is only necessary for me to refer you to the very great increase in the membership of the Ninth district, who have just emerged from this year's membership campaign with a 50 per cent. increase, to show what can be done by united effort and systematic work. A few years ago our membership was augmented by changes in the constitution and by-laws regarding membership, and when we observe what has been done through efforts made at that time and the effect upon our State Society, what may we not expect from a much larger number of members such as we can have by a little effort on the part of those within? We should benefit ourselves, our profession, and humanity. Therefore I recommend that there be appointed a membership committee of one or more from each district society (with power to increase the number) who shall be charged with the duty of increasing their membership. It might be wise to offer some inducement to instil rivalry as to which district should make the greater percentage of gain according to its present memberssip.

PUBLICATION OF A SOCIETY BULLETIN.

I am very strongly of the opinion that our State Society is greatly in need of the assistance that will be afforded by an official *Bulletin*. It is not necessary that it be an expense, it can be made a source of revenue. It should be a means of communication between the district societies as well as between the State and district societies, and last but not least, it is a means whereby the officers and committees can communicate with the members, and official announcements can be made. I refer you to the successful use of a *Bulletin* by the Second and Ninth districts. Our society cannot stand still, we would disintegrate. We must progress. We should be a *live* society. Everybody likes to be a part of a live organization,

and I believe a *Bulletin* to be one of the means of producing a going society. I therefore recommend that action be taken favorable to the early establishment of the State Society *Bulletin*.

APPOINTMENT BY THE STATE OF AN ORAL HYGIENE INSPECTOR.

I am informed that there was inserted into the budget of the state Educational department the sum of $3000 for the oral hygiene purposes this year, providing for an oral hygiene inspector to be attached to the school medical inspection department. It may be permissible for the Oral Hygiene Committe of our society to co-operate in this work, which so essentially pertains to our profession. I therefore recommend that a contingent appropriation be made for the Oral Hygiene Committee, and that they be instructed to investigate, and if co-operation with the Educational department be possible, they may be in a position to do so.

There has been and is now being agitated by old and new organizations in the United States the subject of improvement in the physical conditions of male citizens of the country. The disgraceful physical conditions of our man power as shown in the defects disclosed by the examinations of our volunteer, enlisted, and drafted men to form the national army are such as call for laws and regulations that will compel a physically strong American nation. Just what the best means are to bring about such a condition should be found by representatives of the medical and dental professions. It must be a patriotic duty with us so to rear our children that they may become mentally, morally, and physically fit to fight if need be for our national rights as a democracy. To this end is would seem to me pertinent that the State Society should memorialize the National Dental Association upon a propaganda for universal service and preparedness through national physical standards and other agencies, and the means to attain them.

Permit me to express my hearty appreciation of and my sincere thanks for the work done through the year by the officers and committee members and guests, and all others who in any way have contributed to the success of this celebration. For to them is due all credit. Much credit must be given the clinicians who have consented to interpret the vital operations they have brought to our attention. The hearty co-operation of the manufacturers and exhibitors in helping to make this meeting a success is most heartily appreciated.

I have visited every district society where invited with the exception of one, that omission being unavoidable. All the pleasures of this office come from personal contact with the membership at these gatherings, where hospitality and good cheer prevail. I feel greatly indebted for such hospitality extended to me during the year.

It will be the gratification of a sincere wish if all who attend this meeting shall have a pleasant time, and go away feeling that they have been rewarded for coming.

Dr. Wheeler. The address is referred to the standing Committee on the President's Address, which will report at a later session.

President Rich then resumed the chair.

Dr. William Carr of New York, read a paper entitled "History of the Dental Society of the State of New York."

[This paper is printed in full at page 793 of the present issue of the Cosmos.]

The President then called upon Dr. J. W. Beach of Buffalo to speak on behalf of the Preparedness League of American Dentists.

Dr. J. W. Beach, Buffalo. This is an unexpected pleasure, but we can always say something about the Preparedness League, although I can tell very little that will be new. The work has been going on since war was declared in this country, and about fourteen months prior to that, to take care of the draftee and make him dentally fit to go into the fighting line.

Prior to the declaration of war the work was confined to the National Guard,

and a great number of operations were performed, prior to the active work of the League after war was declared.

In August 1917, the proposition was made to the Surgeon-general that we take up the work of preparing these men in the eastern military department. This was given to the charge of Major Heckard and Dr. Ash, who kindly assumed the responsibility. They appointed directors in different parts of the division, and started work which went on so well that we eventually asked for the whole United States. It was rather a large request, but it was granted us. Then the work of organization proceeded from the New York headquarters, under the direction of these two gentlemen, and a wonderful organization has resulted. It may be new to you to know that each week, for the last six weeks at least, we have received at those headquarters 10,000 cards, each one of which says, "This man is dentally fit to go into the fighting line." This has cost the government nothing, except the salary of the one military representative, Major Heckard.

We feel the work has now reached a point where the dentists of the country may feel that it is properly approved. The government officials have backed up the League in a wonderful way, and I wish I could tell you all I would like to in that respect; but it has been because 15,000 dentists have banded together in this work, and have said to the League that they would give one hour free dental service each day, and would make these men dentally fit for service.

There has been misunderstanding as to the actual status of the registrant in regard to receiving free dental service.

First, I may say we want it particularly well understood that every service rendered in the name of the League must be done absolutely without fee. Even if a man presents himself who is well able to pay that fee, we do not question him whatsoever. If he wishes one hour service, which the League asks shall be given him, he is entirely welcome to it. Beyond that time, if the dentist feels he should not give that man further free service—and we do not mean to interfere with the regular practice of any dentist—if that registrant says he can pay for that service, he should then be discharged as receiving the benefits of the League, and either sent to another dentist or, if he wishes to have the dentist continue his work, he may apply in the regular way to that dentist. The card which is then filled out—Form 3-c—is put in the mail, and the service to the registrant ends there. It is the opinion of those higher than the authority of the League that this service must be rendered in this way without any question whatever.

We want the public to understand that the League is in no wise a part of the government. It is merely sanctioned and approved by the government. The men who apply to us for free dental service have the impression that the government is to pay for this work, and we would like a certain form of publicity to go out correcting that idea. If the public understands this, I believe it will help very much in correcting many misunderstandings. We have those who perhaps wilfully bring up points which rather interfere with the smooth running of the League in that way, but the great object we wish to impress is that it is for our country, for our men, and for our profession. We must make our men as well prepared as possible to undergo the hardships which they will encounter on the other side. We cannot sidestep this issue, and in view of the fact that the League is the only organization which is undertaking this specific work, we should take it up as far as we can, and understand we are the only ones who can perform this service. Anyone can carry a gun, but all cannot do this work. A child can sell war savings stamps and sell Liberty bonds, and take Red Cross contributions. I feel that our professional men should therefore confine their efforts to doing the things which others cannot do. There is not a man here who can in any sense serve his country so well by carrying a gun on his shoulder as he can by filling teeth. Those are a few points we would like understood by our members.

I personally am very deeply imbued

with the feeling that we should inaugurate a simple, practical study course, if you wish to put it that way, or a course of instruction for the lay practitioner. The government is preparing in every way to fit our reserve corps men and regular army dental surgeons to take care of the men when they return injured. That leaves out of the reckoning a man who is taking care of the civil practice. This man should have the benefit of some instruction that will help him to take care of the cases which will return, and which the government cannot take care of, or cases which have slipped past the government officials. We must be prepared to take care of the men who come back injured, and we are trying to formulate a simple, practical course which can be given for these men. I feel sure we have the full co-operation of the dental profession.

The society then adjourned until 2 P.M.

(To be continued.)

Connecticut State Dental Association.

Fifty-fourth Annual Convention, held at New Haven, April 18–20, 1918.

THE fifty-fourth annual meeting of the Connecticut State Dental Association was held at the Hotel Taft, New Haven, Conn., on Thursday, Friday, and Saturday, April 18, 19, and 20, 1918.

THURSDAY—*Morning Session.*

The meeting was called to order by the president, Dr. Elwyn R. Bryant of New Haven, at 11.30 o'clock.

The first order of business was the reading of the minutes of the previous annual session.

Dr. S. L. BECKWITH-EWALL, Hartford, moved that in view of the fact that the minutes had been published by courtesy of the DENTAL COSMOS, the reading thereof be dispensed with. (Motion carried.)

Dr. FRANK J. BUCHANAN, Waterbury, read his report as treasurer.

Dr. B. A. SEARS, Hartford, moved that the same be accepted, and referred to the Executive Committee. (Motion carried.)

The next order of business was the report of the Executive Committee, by Dr. MORTON J. LOEB, New Haven, chairman, as follows:

The Executive Committee is not able to report on the Treasurer's Report at this time, because the balance of the committee has only come here within the last hour. It should be gone over, and we will report at the Saturday meeting.

The committee has purchased four dental chairs, three new ones and one slightly used. It was the purpose of the society to purchase two each year. Last year we could not get any, so this year we purchased four.

The committee wishes to announce that for patriotic reasons it relinquishes the ballroom, where we are to hold our meetings, until about 4 o'clock. Secretary Daniels of the Navy, is here, and the New Haven Chamber of Commerce will give a luncheon at 12.30, when the Secretary will speak.

The Executive Committee arranged for the rental of the ballroom and foyer at a cost of $120 for three days, and an additional cost of $5 per room, per day, for the extra rooms on the tenth floor. We feel the hotel made every conceivable inducement to us to come here, and they have been most courteous in their treatment.

On motion, the report was accepted.

Dr. E. S. Gaylord, chairman of the Committee on Necrology, presented the following report for his committee:

Report of the Committee on Necrology.

Until this morning, I hoped to be able to make the same report as last year—that we had lost no member; but in my morning mail I received the announcements of the deaths of Dr. Charles Burns Erichson of New Britain, and of Dr. William French Gerrish, of Bridgeport.

On motion, the report was accepted.

Dr. Geo. S. B. Leonard, Mystic, presented the following from the Board of Censors:

Report of the Board of Censors.

The Board of Censors, during the year, have held five meetings, and there are now 399 active members in good standing in the association. There are seven honorary members. We have received to date about thirty new applications for membership. We expect only six to be dropped for non-payment of dues. The total of active members will be about 421.

The report of the Committee on By-Laws was presented by Dr. E. S. Gaylord, chairman, as follows:

Report of the Committee on By-laws.

We have presented something in the form of a revision of the Constitution and By-laws. For various reasons, we have delayed this and have been excused, but this year we have sent to each member a copy of the proposed by-laws. That is subject to your approval, and is presented with the anticipation that it will be received cordially.

Dr. Sears. I move that the proposed revised constitution and by-laws be taken up by articles—the secretary reading each article, and the association acting on each individually. (Motion carried.)

The first three articles of the constitution were read and adopted.

Dr. Crosby moved to adjourn at this time, on account of the Chamber of Commerce banquet to Secretary Daniels, to which some of the members were invited.

The society then adjourned until 2.30 o'clock.

Thursday—*Afternoon Session.*

President Bryant called the meeting to order at 2.30 o'clock.

Major Howard A. Giddings of Hartford spoke in the interests of the Third Liberty Loan, and related many interesting facts from his experiences "over there."

A vote of thanks was tendered to Major Giddings for his interesting talk.

Dr. Norman B. Nesbett of Boston, Mass., gave a presentation of "A Simple Method of Supplying Posterior Teeth, Using Cast Clasps." [The substance of this paper was published in the Dental Cosmos for March 1918, page 204. —Ed.]

The next item on the program was the reading of a paper by Dr. Frank A. Delabarre, Boston, Mass., entitled "The Diagnosis of Malocclusion in Its Early Stages."

[This paper is printed in full at page 789 of the present issue of the Cosmos.]

DISCUSSION.

Dr. E. A. Bogue, New York. I have been greatly interested in Dr. Delabarre's presentation, and as he was kind enough to ask me to discuss the paper and perhaps criticize a little, I felt pleased and honored that your president seconded the request.

In the first place, I suppose I am speaking not to orthodontists, but to general practitioners. It has never been my own view that orthodontia should be practiced exclusively by a class of men who declined to acknowledge that they were dentists. I am a dentist and have always been such, ever since I undertook to do anything for a living, and I think I rather glory in it. Dr. Delabarre referred to the curve of Spee. How many of us understand what that curve of Spee is? Spence Bate of England was my guest in Paris once for dinner. He is

a member of the Royal Society. He, although a dentist, was one of the naturalists who were requested to examine the finds of the "Challenger," sent out many years ago exploring for the museum.

He said to Dr. Davenport and myself that the level of the grinding teeth in the human mouth was practically along a straight line. We both denied that, as politely as we could, but he insisted that he had published a number of books and illustrations, and indicated where we would find them in England, and invariably he had made that line of articulation between upper and lower teeth a straight line.

Our friend Spee many years after that discovered and wrote up the curve which takes place when the mandible develops sufficiently. Our friend Bate—at that time about forty-five years of age—did not know that that curve existed.

I speak of that because Dr. Delabarre has taken it for granted that we all know what that curve is.

I want my fellow practitioners of dentistry also to know that the need for early diagnosis of impending irregularities not only exists, but it is quite possible to diagnose those cases a long while before the permanent teeth erupt. I am glad that the preventive idea alluded to by Dr. Delabarre has been established in Boston, for in the section where I live, some of us are still waiting for the permanent teeth to appear before any steps are taken to assure regularity, and the tendency of most orthodontists is to counsel waiting. I cannot myself see any just grounds for that.

I found at the Health exposition in Dresden that the brain of the newborn child weighed 371 gms. at birth, as an average; and I noticed that the brain of the child at six years weighed 1360 gms. I noticed further at that same exposition that the brain of a person of nineteen years weighed 1400 gms. The gain between six years and nineteen years is but 40 gms. in weight—I speak of the average gain—while the gain between birth and six years is enormous. I cannot give it to you from memory.

What is the teaching that we may draw from that? It has been noticed in my own office that most children up to six or seven years of age have a quickness of perception and a power of reasoning that fits them to understand the corrective measures that are being taken in their behalf, and makes them in most instances efficient helpers; while children taken later than that age seldom grasp the situation or its details, and are as apt to place themselves in opposition to our wishes as they are to be helpful. Hence the percentage of successful cases begun before the expiration of the sixth year, I should think would be about 99 per cent.; but from the sixth year to the thirteenth year I think it would depend upon the intelligence, patience, self-denial, and Christian fortitude of the operator—to say nothing of the endurance of the mother—whether we had any successful cases or not.

Dr. Delabarre says malocclusion is seldom a local disturbance, more often a local symptom of larger or more remote causes, producing results elsewhere. Quite right. And now I wish to make my grateful acknowledgments to him for having referred to my great trouble in learning how and when to diagnose these cases. And as I possess, I think, the largest number of models of cases reaching back into the past, of anyone I know of—although those models may not be very perfect, I think the teeth are sufficiently so to judge from—I find that no case that does not exceed the 28 mm. in breadth between the palatal edges of the second deciduous molars is ever able to develop normally. I find there is a physical weakness that interferes, and there is where we come in as practitioners of the science of medicine, and where our teachings—I think I am justified in using that word—to the medical practitioner may be of help to him. The medical practitioner sees these children long before we do, and he can with perfect ease, using a little millimetric measure, at once—in two or three seconds—test the width of the arch between the second upper deciduous molars any time after the complete eruption of the deciduous

teeth. This occurs at two and a half to three years of age, and from that time until the time the permanent teeth begin to erupt, at about six years or later, these measurements can be taken; and we should, I think, instruct him that when he finds no greater width than 28 mm. it is time to call in the dentist, or, if he prefers, an orthodontist, if there is no dentist who is qualified along those lines. He will also find in more than half the cases of impending irregularity a curvature of the spine, more or less pronounced.

I happen to have in my satchel now the model of a little girl, the daughter of a dentist, who took an impression of the little girl's mouth at two years and ten months. I never saw the child until last week. She is now six and a half years old. I said to her father, who had given me this first model to look at, "You will find that child has not grown laterally at all." "What!" said he, "in all those years!" I said, "No, sir, not at all." He brought in the child, models were made, and there is no growth. The father has asked that the arch be spread. There is just time to do it, but I think the gentleman was very much surprised to find there was not a hair's breadth of growth in all those years.

A physician was sent to me with his two children some years ago. I took impressions and made models, and advised spreading the arch; but nothing was done; three years passed. He came again, and brought his two children. Impressions were taken, models were made, and nothing was done; three years more passed. He came again, and this time brought three children. Impressions were taken, models made, and nothing done; but an appointment was made with my then assistant, Dr. McKnight, to go on with the older daughter. Before that appointment could be kept the father telephoned me that that daughter was in an asylum, and he had received word she would never recover her mind.

I received a hint then and there not to mention that in this connection. I have violated the hint for this reason: Some years ago Dr. Lawrence Baker ground off the teeth of three rabbits out of a litter of five. You are all familiar with the experiment, which resulted in mastication being done on one side of those rabbits' mouths. The whole litter of rabbits was simultaneously killed, and their skulls examined, and all that side of the head which had been deformed by grinding off the teeth was found to be smaller than the other side. That experiment, in substance, was repeated by a gentleman in Berlin University, who removed the germs of teeth from some puppies. The mutilated sides of those heads were all smaller, owing to interference with the proper performance of function.

Dr. G. V. I. Brown did the same mutilation practically some years ago, again with the same results. We do know that the size of the brain has to do with the intelligence of the owner of that brain. We suspect it has something to do with it, but the convolutions of that brain have more to do with it. Yet when we find the size of the brain-case diminished by failure to masticate, and failure of the muscles to exert their specific influence in regard to the growth of the bone, we find there has been a diminution in the necessary vital force which should have brought these animals—whether two-legged or four-legged—to completion.

Therefore I most heartily second Dr. Delabarre's conclusion and hope we will all make it our duty to examine carefully into the width of the dental arches of growing children, to see whether or not prevention is not a great deal better than subsequent cure.

Dr. F. L. Stanton, New York. I think this is a very important topic for general practitioners. It has come late in our professional life, because the evolution of dentistry has been upside down. The first dentists were thinking of substituting artificial substitutes; then they thought of patching teeth, and then holding pyorrheal teeth in the mouth, but they did not think of doing this preventive work which is engaging our attention now. I think this is a most important paper, and one that should be taken home with all of us, because if Dr. Dela-

barre is right, and there are 90 per cent. of the children in your practice at six years who need this treatment, you should familiarize yourselves with the diagnostic signs. The only thing I can add to this paper is to emphasize a way in which you can more forcibly impress upon the patient the need of this treatment.

Dr. Bogue's idea of the 28 mm. is fine, but you want to be very careful you are on the right side.

In order to impress upon you a diagnostic sign, if you will take this chart, you will realize that these three teeth (indicating) are fully as wide as the three permanent teeth that will follow. Explain that to the patient's parent. If that space is wide enough, you will have plenty of space for the cuspid. You will then have to have space for the four teeth. You can say to the parent of the patient, "Unless you have space here, you cannot get a 7-mm. tooth in here. A small central is 8 mm., so if you have no space between the deciduous teeth, you will have an arch that is too small."

I understood Dr. Delabarre to say in referring to Fig. 5, there is good occlusion and a good curve, yet the median lines did not correspond. It would be a physical impossibility, if you had two curvatures that are good, it would be a physical impossibility to have two good dimensions, and not the third. However, that is splitting hairs. The idea you want to get at is that the parents should be taught this.

What is the deviation from the normal? What is the normal for this patient? Now that you have pointed out to your patient that there is an impending malocclusion here, how does Dr. Delabarre explain to the patient what he is going to do? What are you going to do, after you have advised the patient that that malocclusion needs treatment?

Dr. F. T. Murlless, Hartford. There are two things I wanted to say. One is, I think Dr. Bogue has rather overstated his attitude in regard to dentistry. I think I might say in truth that orthodontia (I am speaking for myself individually) has made better dentists of us, and I think we are proud of the fact that we are better dentists. In observing my friends who are orthodontists I feel sure, from my acquaintance with them before and since they have taken their courses in orthodontia, that they are better dentists.

Dr. Delabarre (closing the discussion). It is significant to think over those figures Dr. Bogue gave you in regard to the growth of the brain. I cannot give it to you stated in percentages, but you can see that the child's brain attains almost its full weight at the age of six. It is also a fact that the width across the deciduous arch in the bicuspid region has been fully attained long before the bicuspids come to supplant the deciduous molars. Once attained, there is no further growth in that region, so it is important that this width should be secured for the child when the width is due to come, and not later.

Dr. Stanton spoke of the difference in the measurements of deciduous and permanent incisors. Black's figures are not absolutely dependable, because they are taken from indiscriminate teeth, and not teeth taken from sets; but it shows there must be a growth of 7.6 mm. between the upper deciduous cuspids in order to accommodate the permanent incisors; and in the lower, the growth necessary is 6 mm.

With regard to Dr. Stanton's criticism of my explanation of Fig. 5, where I said you have a deviation in the lower and upper incisal median line—you may have that alone without any of the other complications. What I meant was this: From your examination of the child in the chair, you could see no disturbance of the arch curve as such. If you look at one model without making a critical examination, it might appear to you to be a good, normal curvature; but the deviation in the arch curvature—the lateral asymmetry—will appear only upon very careful examination.

I have purposely confined this paper to the subject—the diagnosis of malocclusion in its early stages—and made no attempt to go into the question of causa-

tion or anything else. I simply wanted to present these seven diagnostic signs so you may apply them in your practice, and give the parents of those children the proper advice, and be able to answer their question, "Has my child crooked teeth?"

Dr. Bogue. Some years ago a lady quizzed me extensively before she would allow her children to come into my hands. She finally brought them, and after I had had them several years, in 1894 I requested permission to take impressions of the mouth of her little girl then four years of age. Permission was granted, and I took them. At that moment, after I had made my model, I said to the mother, "I think if you will examine a baby's skull, at six years of age, from which the anterior plates of bone have been removed so as to show both deciduous teeth roots and the crowns of permanent teeth, you will agree with me that if I can find distinct irregularities in your little girl's teeth, we are safest in moving those deciduous teeth now to where we think they ought to be." She gave permission to move them.

It is evident to every one of my professional brethren who hears me at this moment that I was risking my whole practice—I was risking my professional life—on the correctness of my diagnosis. I would only add that it proved to be so correct that from that day—I began my correction in 1898–99—to this, I have carried that correction forward. Those first children, I am proud and happy to say, are still with me as patients. Several others have been, but I never again shall fail to sustain Dr. Delabarre in his contention that we all owe as a duty to our patients the early detection and prompt correction of the impending irregularities which we are perfectly able to detect at a very early age.

The meeting then adjourned to 8 P.M.

THURSDAY—*Evening Session.*

The meeting was called to order by President Bryant at 8.30 o'clock.

Dr. M. J. LOEB, New Haven. It is customary to give each man who occupies the president's chair of this association some slight token of appreciation from the members. I am in a position this year to say that no man is more deserving of that honor than the present incumbent of the office. I have worked with him for more than two years, and it has been a pleasure to see the interest he has taken in the society.

It is with a great deal of pleasure, Dr. Bryant, that I present this gavel to you on behalf of the association.

The PRESIDENT. All I can say is, I thank you. I will try to use it to advantage.

Dr. PERCY R. HOWE of Boston, Mass., gave an address entitled "Some Ideas in Regard to Root-canal Work." The address was illustrated by lantern slides and chemical tests.

Dr. LEONARD moved a vote of thanks to Dr. Howe for his most interesting and instructive address. (Motion carried unanimously.)

Mr. IRVING L. BROWN addressed the members on behalf of the Dentists' Mutual Alliance.

The meeting then adjourned.

(To be continued.)

THE DENTAL COSMOS

A MONTHLY RECORD OF DENTAL SCIENCE.

Devoted to the Interests of the Profession.

EDWARD C. KIRK, D.D.S., Sc.D., LL.D., *Editor.*
L. PIERCE ANTHONY, D.D.S., *Associate Editor.*

PUBLISHED BY THE S. S. WHITE DENTAL MFG. CO., PHILADELPHIA, PA.

SUBSCRIPTION PRICE, including postage, $1.00 a year to all parts of the United States, Hawaiian Islands, the Philippines, Guam, Porto Rico, Virgin Islands, Cuba, and Mexico. Canada, $1.40. To other foreign countries, $1.75 a year.

Original contributions, society reports, and other correspondence intended for publication should be addressed to the EDITOR, Lock Box 1615, Philadelphia, Pa.

Subscriptions and communications relating to advertisements should be addressed to the BUSINESS MANAGER of the DENTAL COSMOS, Lock Box 1615, Philadelphia, Pa.

PHILADELPHIA, SEPTEMBER 1918.

EDITORIAL DEPARTMENT

Co-operation in Scientific Research.

AT the recent thirty-fourth annual convention of the American Institute of Electrical Engineers, the president, Mr. E. W. Rice, Jr., who is also president of the General Electric Company, in his annual address, briefly referred as follows to the time and attention which had been devoted by electrical engineers to the solution of many war problems:

> A work which has caused means for the detection of the pirate submarine; wireless signaling and telephoning for army and navy, and aircraft devices; searchlights of novel design and great power; improved methods in the manufacture of ammunition and ordnance; electro-chemical work of every description; electric welding; X-ray sets of greater simplicity, and many other lines too numerous to mention.

As contributory factors to the gratifying results attained in the lines referred to, he states that

> The great industrial research laboratories, the educational and governmental research departments, have all co-operated enthusiastically and effectively, and the members and their staffs have labored day and night, without regard to pecuniary reward or public applause, sustained entirely by the high purpose of giving their best to the service of the country. I hope the time may come when the story may be told, so that the world may realize the debt which it owes to scientific men and engineers, without whose arduous, unselfish, and almost inspired work, our cause, righteous as it is, would have no chance for a victorious conclusion.

The foregoing statement, made by one so well qualified to speak with the authority begotten of wide knowledge of his subject and a broad view of human affairs, is both interesting and important; interesting because it is a picture of large things effectively done, and important by reason of its revelation of the means and the spirit by which the achievement was made possible. The winning of the war has demanded from everyone in the Allied cause the highest type of service of which he is capable, and the utmost promptness and efficiency in its rendering. The creative faculties of the nation and its limits of resourcefulness in man power, in material and intellectual efficiency, are commandeered by the Government in the national service, and it is the harmonious co-operation of these resources that will eventuate in making the world safe for democracy and a decent place in which to live.

What has been done in electrical engineering is an index of what is taking place in all branches of human endeavor, but what is particularly striking in the reference we have quoted from President Rice's address is the co-operative element in and among the great industrial, educational, and governmental scientific research laboratories that has made possible the important electrical engineering developments which he specifies. Never before has there been so strenuous, so insistent a demand upon applied science for the solution of practical problems as the present war necessity has created, and in the effort to meet this demand the development of practical results has been correspondingly rapid and fruitful.

To achieve the results already attained there has been a notable and praiseworthy breaking down of barriers that in antebellum times were obstacles to scientific development in its practical applications. Problems wrought out and discoveries made in industrial research laboratories were safeguarded as the bases of commercial enterprises, and in a similar way much work done even in

educational institutions was monopolized or protected by patent right for individual gain. The necessities of the nation at war are inculcating a broader outlook and more altruistic spirit, so that co-operation for the common weal is coming to be the keynote of individual effort.

Dentistry has made for itself an enviable record in the way it has responded to the Government requirement for its specialized service in the war emergency. But we shall have failed of reaching the full measure of good to the profession of dentistry itself in the giving of that service if we fail to take cognizance of and to practically realize the new ideals and larger purposes which the war experience is developing in allied lines of activity. Of fundamental importance is the co-operative spirit among scientific activities in industrial, educational, and governmental research laboratories as noted by President Rice.

We clearly realize the crying need in dentistry for scientific research in the solution of an endless variety of problems that we deal with wholly empirically at present. A praiseworthy beginning has already been made toward a research foundation by the National Dental Association, but much more is needed if dentistry is to be placed upon a practically sound scientific basis. First and most important is the need for the same spirit of co-operation among the dental scientific research laboratories already established as that noted by President Rice as now existing among the research laboratories more particularly concerned with electrical engineering problems. The time is passing when dental research laboratories, even those connected with the large dental industrial enterprises, can be conducted wholly for commercial gain. No individual or corporation can rightfully control scientific research, and, as a practical matter of fact, those things which were formerly regarded as "trade secrets" quickly become common knowledge, so that the tendency is toward a broader view of these questions, for the spirit of the time tends toward interchange of ideas and practical co-operation in those lines of endeavor concerned with scientific development even among industrial enterprises.

We have to suggest, in view of the foregoing, a survey of the existing resources of dentistry with respect to scientific research, and their co-ordination for the good of the whole profession. In principle we believe the suggestion to be right. Its

practical application would economize effort by avoiding repetition of work and the re-discovery of known facts, and would bring to light and into general usefulness much important matter which is not now utilized because it is not recognized. Most of all there is needed competent, broadminded, and unselfish leadership to make the suggested plan effective; but where the way is clear, leadership will come.

The Greene Vardiman Black Memorial.

There could have been no more fitting climax to probably the largest meeting that the National Dental Association has ever held than the dedication of the memorial statue (see Frontispiece) to Dr. G. V. Black, which took place on Thursday afternoon, August 8th, at the time of the National meeting in Lincoln Park, Chicago, in commemoration of the lifework of Dr. Black.

Thursday noon a luncheon was given by the Association to the past presidents of the American Dental Association, the Southern Dental Association, and the National Dental Association, at which time Dr. A. W. Thornton of Montreal, Canada, paid a glowing tribute to the memory of Dr. Black, and immediately thereafter the audience reassembled in Lincoln Park, where the formal unveiling and dedication of the memorial monument took place.

Dr. C. N. Johnson, a lifelong friend and co-worker with Dr. Black, presided as master of ceremonies, introducing the various speakers who took part in the exercises. Dr. Truman W. Brophy presented the monument to the Lincoln Park Board of Commissioners, with a brief history of the movement which culminated in the erection of the memorial to Dr. Black. The principal address was delivered by Dr. Thomas L. Gilmer, an intimate friend and close professional associate of Dr. Black, in which he recounted the works of Dr. Black and recited many interesting personal reminiscences of his professional career. The monument was unveiled by four little granddaughters of Dr. Black, Misses Elizabeth Black, Mary Barbara Black, Jane Black, and Helen Baldwin.

Coinciding as it did with the sixtieth anniversary of nationally organized dentistry, it was peculiarly appropriate that the dedi-

cation should take place at the same time, for Dr. Black's life-work was coeval with the development of dentistry into a profession. When Dr. Black entered dentistry it was in a chaotic and unsettled state, and it was due to the activities of Dr. Black and men of his type that an organized scientific profession was evolved from what was previously an empirical vocation.

Dr. Black's was a distinctly scientific mind, and from the time of his entrance into the profession he began to devote his energies to the standardizing of instruments, materials, and methods of practice, and it was not long before the profession began to reap the benefits of his valuable work. Without doubt Dr. Black's investigations and studies were directly responsible for the high state of perfection that has been attained in the manufacture of dental alloys; and in the field of Operative Dentistry his name will always be revered as the benefactor of the profession for having developed a definite, scientific method of procedure for cavity preparation in carious teeth. The limitations of space will not permit the recounting of the many benefactions which Dr. Black's work conferred upon dentistry, but the above will serve as conspicuous examples from a life whose constant aim was for the betterment of his fellowmen and one characterized by an unswerving devotion to the profession which he chose as his sphere.

Dr. Black was deeply interested in the development of dental education, and as the result of his activities in this field of labor his name is inseparably associated with every advance in dental education made during the sixty years of his association with dentistry.

Those who were fortunate enough to be present and observe the Black Historical Exhibit at the National meeting under the supervision of Dr. William Bebb gained some conception of the stupendous amount of work done by Dr. Black, not only in dentistry, but in other fields of science and art. His literary activities were not confined to dentistry, but his breadth of mind and knowledge showed its diversity in numerous subjects not particularly related to his professional work. In the exhibit above referred to were the original manuscripts of treatises by him on such subjects as "The Wasp," "The Seventeen-year Locust," "The Earthworm," "Tornadoes," "Fossil Woods," "The Use of Books," "Mechanic Arts," "Morality," "The Theory of Sight," "Our Police

System," "Indian Stories," etc., ample proof of a versatility that is possessed by few men in any walk of life.

Dr. Black's was a conspicuous exception to the fate of most great men, in that during his lifetime he was the recipient of almost every honor that could come to one in the dental profession, and this handsome memorial statue is but the crowning honor to a life that merited and received full and ample recognition of its greatness.

Transactions of the Inter-Allied Dental Congress.

In our June issue we published a review of the above report of the proceedings of the Dental Congress of Allies held in Paris in 1917 under the patronage of the French Government.

The report is a remarkable exposition of oral surgery as applied to injuries of the face and mouth occurring in the present war, and comprises many valuable contributions from the leading men of Europe in this branch of surgery.

On account of the present war conditions the cost of producing these Transactions has necessarily been large, and the Secretary-general has requested us to give the fact that they are now ready as much publicity as possible, to the end that a sufficient number of subscriptions may be received to defray the expenses of publication. The report comprises two large volumes of 1600 pages, profusely illustrated with 1100 half-tones. The price is 30 francs (approximately $6.00), exclusive of postage.

We heartily commend the work to every dental surgeon as the most comprehensive compilation of oral war surgery that has appeared in our literature, and one that will without doubt prove very valuable to everyone interested in war surgery, and particularly so to the oral surgeon.

We shall be glad to receive subscriptions for the volumes and forward them to the Secretary, or they may be sent direct to Dr. Henri Villain, Treasurer, 45, rue de la Tour d'Auvergne, Paris, France.

Bibliographical

Dental Electro-Therapeutics. By Ernest Sturridge, L.D.S., (Eng.), D.D.S., Fellow of the Royal Society of Medicine, Member of the British Dental Association; Member of the British Society for the Study of Orthodontics; Member of the American Dental Society of Europe; Contributor on Dental Electro-Therapeutics in "The Science and Practice of Dental Surgery," and on Ionic Medication in Prinz's "Dental Materia Medica and Therapeutics." Second Edition, thoroughly revised. Illustrated with 164 engravings. Philadelphia & New York: Lea & Febiger. 1918. Price, $2.75.

This, we believe, is the only work in our literature devoted to the subject of electro-therapeutics exclusively from the dental standpoint, and it is presented by an able and enthusiastic advocate of dental electro-therapeutics and particularly ionic medication in dentistry.

The author devotes the first portion of his work to electro-physics, and while the size of the book prohibits an extensive treatment of this science, the elementary aspect of it is presented in a clear and concise manner, and embodies knowledge which every dentist should have who undertakes to apply electro-therapeutics in the practice of dentistry. A very considerable portion of the work is devoted to the description and management of the various electrical appliances which the dentist is called upon to use.

The chapter on the use of the Roentgen Ray in dentistry is quite complete, and contains information that should be in the hands of every dentist who uses the roentgen ray. Under this subject the author proffers some very valuable suggestions in interpreting radiographs, which if closely followed would help to avoid many mistakes that in the past have resulted from "cocksure" diagnoses made from inaccurate readings of the roentgen-ray picture.

The author says in his preface that the book is primarily "intended to bring forward the value of electro-sterilization in treatment of root-canals and periodontal diseases," and this portion of the book has been rewritten and enlarged to cover that subject more specifically than did the first edition, giving in detail the method of procedure and the proper technique to be followed in the treatment of various disease conditions of the apical areas of the teeth, the application of electro-therapeutics as an aid in the treatment of pyorrhea, etc.

Army Dentistry. (Forsyth Lectures for the Army Dental Reserve Corps.) Edited by Frederick A. Keyes, D.M.D., former Visiting Dentist, St. Vincent's Orphanage, Boston; Consulting Dentist, Medfield State Hospital, Medfield, Mass.; Librarian and Curator of the Museum, Forsyth Dental Infirmary, Boston. New York and London: D. Appleton & Co. 1918.

The title of this book is "Army Dentistry," and its subject matter consti-

tuted a course of lectures delivered to the "Army Dental Reserve Corps," or, strictly speaking, to a section thereof, at the Forsyth Dental Infirmary. The lectures are presumably an exposition of the curriculum of specialized instruction authorized by the Surgeons-general of the Army and the Navy for officers of the Dental Reserve Corps, as printed in the introductory part of the work. One hundred and sixty-four pages, constituting the first five chapters, are devoted to elementary matters which in more detailed and systematic form are embodied in the standard curriculum of dental schools, and with which the members of the Dental Reserve Corps may safely be assumed to be familiar; therefore, why should they be rehearsed?

The chapter on Maxillary Fractures is open to the same criticism, and further, it is mainly a compilation of methods and appliances taken from older writers of standard works on the subject, *e.g.* Kingsley, Garretson, Heath and Hamilton, and Angle, with a few illustrative cases from the reports of the American Ambulance Hospital in Neuilly by Dr. G. B. Hayes.

Chapters on Examination of the Mouth, Extraction of Teeth, Novocain Technic, Anesthesia, and Roentgenology follow—all of which is old and familiar matter to the dental graduate.

The chapters on Surgical Technic and Bandaging, Infective Diseases, Venereal Diseases, Appearances of the Mouth in Some of the Common Infectious Diseases, Recent Advances in Dental Surgery and Technic, and on Military Administration are interesting and are germane to the scope implied by the title of the work, but we confess that our inductive reasoning faculty is taxed to a degree in the endeavor to trace out the connection between "Army Dentistry" and the following information with respect to the Care of Horse: "If a horse has been brought up in the army, he has been taught by experience to take care of himself. . . . If a horse is not acting normally, his rider can be sure he needs food or water or some of the other essentials"—in which respect, we may add parenthetically, the horse resembles a flivver, but differs therefrom in the respect that, to quote again, "He must be approached on the right side and never riled."

We cannot conscientiously say that we think this book fills a long-felt want, or at any rate a generally recognized need.

Books Received.

Books received are acknowledged in this column, and such acknowledgment must be regarded as a sufficient return for the courtesy of the sender. Selections will be made for review in the interests of our readers and as space permits.

"Oral Primer." Presented by the Educational Committee of the Genesee County Dental Society, New York.

"Prophylactic Rhymes." Published by the Oral Hygiene Committee of the Dental Society of the State of New York. Copies of this booklet may be procured from Dr. A. W. Smith, 33 Chestnut st., Rochester, N. Y., chairman of the Oral Hygiene Committee.

"A Child's Book of the Teeth." By Harrison Wader Ferguson, D.D.S. Illustrated by the Author. Yonkers-on-Hudson, New York: World Book Co., 1918.

A commendable group of primers intended for the instruction of school children in oral hygiene, presenting methods of caring for the teeth in an interesting and attractive manner which should appeal to the little ones.

Review of Current Dental Literature

[*Journal of the American Medical Association*, Chicago, May 11, 1918.]

A Surgeon's Impression of Trigeminal Neuralgia, Based on Experiences with 302 Cases. By Chas. H. Frazier.

True trigeminal neuralgia must not be confused with a peripheral neuritis initiated by some infective focus in tooth or sinus, or with the neuritis of toxic or obscure origin. One occasionally hears or reads of the cure of trigeminal neuralgia by the drainage of a sinus, by an intranasal operation, or by the removal of an infected tooth. Frazier has never seen or operated on a patient in a case of the major type of trigeminal neuralgia in which there was any reason to suspect any one of these lesions as the exciting cause. If this were accepted, it would serve one useful purpose; that is, vain attempts to find peripheral lesions as a cause would be abandoned, and patients would be spared many sinus operations and the extraction of a majority of sound teeth.

The facts presented in this paper are the outcome of an experience with 302 cases of neuralgia of the trigeminal nerve. This includes 39 peripheral operations, 99 alcoholic injections, 130 intracranial operations, and 34 cases that were not treated.

There are no grounds for discussing any method of treatment other than alcoholic injection or the avulsion of the sensory root. The alcoholic injection is of only transitory effect. Properly given, it will arrest pain immediately and absolutely, and for an average period of nine months. It is in no sense of the word a permanent cure. The radical operation assures absolute and permanent relief. As an exception to the generality of these two methods, there are a few cases in which the pain is limited to the distribution of the supra-orbital branch. Alcoholic injection of this branch is not very effective; peripheral resection may with propriety be employed first.

The untrained physician is no more qualified to employ alcoholic injection than he is to perform the operation. Frazier stresses the fact that with confidence born of experience the injection may be made painless. Great caution must be taken as to the injection of the Gasserian ganglion. The incidence of corneal complications, apart from injuries to the abducens and oculomotor nerves, is not small. The toll is too high, and Frazier makes prohibitive the treatment by injection, except in the few instances in which the operation may be contra-indicated.

Since 1901, in almost all his cases Frazier has practiced the avulsion of the sensory root as a substitute for gangliectomy. Physiologically sound and technically practical, the avulsion or even the division of the sensory root is in every sense a radical cure. Frazier gives the general principles of the technique, and this part of the article is very well and clearly illustrated.

In considering the results Frazier refers only to the major operation. There can be no doubt as to the permanence of relief if the entire root is sectioned. His first operation was performed in 1901, and when last heard of, fifteen years after the operation, the patient was free from pain. In all his 121 intracranial operations, he has only once been called to operate a second time. In this case the inner portion of the root had escaped section. The motor and sensory sequelæ are of no very great moment, at least when compared with the intense suffering for the relief of which the operation is performed. The only sequel that might be said to be of serious moment is keratitis. If promptly recognized and properly treated the corneal ulcer will heal.

There seems to be an extraordinary misconception on the part of the profession as

to the status of the operation on the ganglion or root. It is usually represented as a sort of kill-or-cure method, as a result of which the patient, if he survives, will be paralyzed on one side of the face, and will lose his eyesight. Because of the frame of mind in which the patient consults the surgeon, the former needs some reassuring. In stating the risks of the operation, Frazier refers only to his own clinic. Since 1901 there have been four deaths in 160 operations. Two of these were due to apoplexy, and all of them were among the subjects of the 121 intracranial operations. In a series of 87 consecutive operations there have been no deaths since 1912.

Over other radical operations, such as the removal of the ganglion, the Abbe operation, or the Hutchinson operation, avulsion of the sensory root has so many advantages that it should be and is recognized as the operation of choice. It is easier of execution than any other; it subjects adjacent structures to no risk, and it is attended with a smaller percentage of corneal complications and with a lower mortality.

[*Journal of Medical Research*, Boston, March 1918.]

The Bactericidal Action of Arsenical Compounds on Experimentally Produced Streptococcic Septicemia. By Clarence S. Allison.

It has been known for some time and now is generally appreciated that in those cases of pyorrhea alveolaris or other gingival affections in which spirochetes could be demonstrated the various organic arsenical preparations exert an almost specific action. In the *British Dental Journal* for March 15, 1918, p. 197, is a note to the effect that W. Kolle has identified a particular spirochetal form which he believes plays the principal part in pyorrhea, and records marked improvement sequent to intravenous injection of neosalvarsan.

The present study of Allison is of interest in that it demonstrates that the indubitable clinical improvement following administration of arsenicals is not of necessity solely attributable to their spirocheticidal specificity.

Colebrook and Douglas (*Lancet*, London, January 22, 1916, pp. 81 and 181) proved that salvarsan and neosalvarsan are bactericidal for cultures of staphylococci, both in watery solution and in the serum and whole blood of patients who had received therapeutic injections of arsenical compounds. Allison here offers experimental work showing that salvarsan, neosalvarsan, and arsenobenzol have a marked bactericidal action on different strains of streptococci *in vitro*, and that these arsenicals are of value in the treatment of experimental septicemias due to these organisms.

For this work, there were used fifteen different strains of streptococci, representing both the hemolytic and the viridans groups. It is inferable that none of these strains were isolated from dental lesions. The experimental animals were rabbits.

The results of Allison's study with watery solutions of salvarsan, diarsenol, and arsenobenzol lead to the following conclusions:

(1) They possess a distinct bactericidal power against virulent strains of streptococci *in vitro*, in dilutions up to 1 : 3000, and an inhibiting power over these organisms for at least twenty-four hours in weaker dilutions.

(2) They possess a bactericidal action against streptococci in the blood stream of animals (rabbits). The success of the treatment depends largely upon the virulence of the organisms, and upon reaching them before they become localized in remote parts of the body.

(3) They produced no untoward effects on the animals in which the maximum doses were frequently repeated.

Miller and Chalfant (*Journ. A. M. A.*, June 22, 1918, p. 1975) give a note upon the treatment of puerperal blood-stream infection by means of arsphenamin. In seven of the women a streptococcus was found in the blood. "With the intravenous injections of arsphenamin we have been able to rid the blood stream of its invading organism in every instance. All varieties of organisms so far encountered seem to be equally influenced. After arsphenamin has been given there is a marked increase in the leucocyte count." These clinical results strikingly confirm Allison's laboratory findings, and suggest that the good clinical results of pyorrhea treatment with arsenicals are possibly attributable not solely to their spirocheticidal properties.

[*New York Medical Journal*, June 22, 1918. (Scientific Proceedings of the American Medical Association.)]

Retention Cysts of the Mucosa of the Lip. By R. L. Sutton and F. Simpson.

Sutton had several cases of these retention cysts on the lower lip. They were about one-fourth to one-half inch in circumference, covered with normal mucous membrane, and contained mucous secretion and cells. He had treated them by evacuation, cauterizing the base with some chemical agent. W. A. Pusey had had considerable success in treating these cysts by the cautery.

The Lipoids in Tumors of the Dental System. By K. W. Dewey.

The chief lipoid in tumors about the mouth, as in other parts of the body, was cholesterol, occurring as the stable ester compound and much more frequently in more or less loose combinations with fatty acids and other lipoids. Such crystals were mostly doubly refractive. Mixtures of cholesterol with glycerin esters or neutral fat had no such properties. In the tumors studied cholesterol in these various forms was found to occur much more in the connective tissue stroma, in endothelial and other connective tissue cells than in the tumor cells themselves. A noteworthy observation was that frequently leucocytes were completely filled with these lipoids. A finding which is almost without notice in the literature was the presence of fatty acids and soaps in the zone of squamous epithelial cells of papillomata and other pathological conditions of the mucosa. A condition resembling cornification of the epidermis, characterized by the occurrence of fatty acids, was not so rarely found. The lipoid substances associated with degenerative processes found in tumors of the dental system were possibly particularly suitable for investigation of the important question as to what substances were involved in the process of calcification.

Use of Heat and Radium in Treatment of Cancer of Jaws and Cheeks. By G. B. New.

In the cases treated there was no glandular involvement. The method consisted of the thorough cautery of the growth with slow heat for from twenty to forty-five minutes. A soldering iron and a water-cooled retractor were the most satisfactory means of cauterization. This was followed by radium treatment. The immediate results of this treatment in this group of cases are very encouraging. Twelve of the twenty patients on whom this report is based had no recurrence locally or in the cervical lymph nodes for from six to eighteen months.

[*Journal of the National Dental Association*, July 1918.]

Progress of the Year in the Investigation of Mottled Enamel, with Special Reference to Its Association with Artesian Water. By Frederick S. McKay.

The present report is primarily a survey of the geographical distribution of this peculiar lesion, with special emphasis on the artesian basin of South Dakota. The evidence presented by the examinations of this district make it plain that there is a relation most definite and conclusive existing between the use of water drawn from these artesian wells during the period of enamel growth and the existence of the enamel lesion.

Another endemic region is found in the Bahama Islands. In this locality it appears that if the water be the cause of the lesion it is because of something it takes from the soil, since water which does not come into contact with the soil (rain-water gathered in tanks) is unassociated with mottled enamel. It is difficult to understand what relation can exist between water obtained from the shallow wells in these limestone coral islands, in the ocean, and that flowing from the Rocky Mountain range, hundreds of miles underground, to supply deep artesian wells far in the interior of the country (South Dakota region). Undoubtedly it strengthens McKay's attitude in directing the study of this problem, that the only way a solution can be reached is by a most careful comparative chemical analysis of the waters.

The rest of the report is occupied by a consideration of two theories which have been advanced to explain the etiology of mottled enamel.

Grevers of Utrecht, Holland, is decidedly of the opinion that thyroid disturbance, or at least underlying constitutional factors, will be found to contain the solution of the difficulty. The one circumstance connected with

glandular dystrophy (goiter and cretinism) that exists in common with mottled enamel is its sharply defined geographical localization. But against the correctness of this analogy is the fact that the individuals with mottled enamel fail in any particular degree to present unmistakable evidence in other parts of the body of malfunctioning of the endocrine organs.

Grever's conclusion is that mottled enamel is simply immature or not fully calcified enamel, and not a manifestation of an inherent lack of the cementing substance. Whether or not this view be eventually corroborated, to McKay the real problem remains unchanged, viz, to locate the influence which either prevents the maturing of the outer layers of the enamel or else partially destroys this layer after it has once been fully formed.

The second theory to be discussed by McKay is that of Gasparini and Piergili (see DENTAL COSMOS, July 1918, p. 631). In harmony with the views of these men, in the American endemic districts the waters have been lacking in "mineral salts in general, and in calcium salts in particular." But the conditions in the Bahama Islands' endemic region invalidate the significance ascribed to the calcium content of the potable waters. These islands are coral reefs, solid, calcareous material. What shall we say of rain-water with reference to its lime content after running over and through such a soil?

It seems to McKay that the conception of Gasparini and Piergili of this lesion and its production is faulty in its first fundamental, and it cannot be understood how they failed to notice that teeth which have mottled enamel erupt with the enamel in this condition, which means that this is brought about during the developmental period, and before the enamel could possibly have come into contact with any water which passed through the mouth during the act of drinking.

In conclusion, McKay states his belief that the damage is wrought by some influence which acts either in an inhibitory or in a destructive way upon the enamel during or immediately after the building period (which of these two hypotheses, if either, will finally be found to be correct, it is impossible at present to say), and reiterates that the condition is established prior to eruption (*contra* Piergili).

[*Laryngoscope*, St. Louis, December 1917.]

Salivary Calculus. BY W. W. CARTER.

[*Revue Médicale de la Suisse Romande*, November and December 1916, per *Laryngoscope*, St. Louis, March 1918.]

Acute Suppurative Whartonitis.

The latter of the two above articles is a brief case history. It concerns a woman, age forty-eight years, complaining of severe pain and swelling in the right submaxillary region, difficulty in opening the mouth, salivation, and immobility of the tongue. Examination revealed a calculus in Wharton's duct, which when extracted was found to be 1.5 cm. long and 2 mm. thick. It had a slight longitudinal groove so that the duct had not been completely occluded. Removal of the calculus was followed by escape of thick pus.

The subject of Carter's report was an adult male, who experienced a sudden, stinging pain on the right side of the tongue. The right side of the floor of the mouth became swollen, increasing rapidly on taking food, and subsiding a short time after a meal. A small calculus, about the size of a mustard seed, could be seen obstructing the mouth of Wharton's duct. Upon removal, symptoms disappeared.

A little less than two years later there was a reappearance of similar symptoms. The X-ray showed a large, pear-shaped calculus and two smaller calculi. On removal the largest was about the size of a cherry pit; the small ones about the size of mustard seeds.

After apparently almost immediate recovery from the operation, there occurred an unexpected complication, which Carter has not found mentioned in the literature. On the third day after operation the opposite submaxillary and both sublinguals became sympathetically involved, and for four or five days the patient was completely incapacitated. The parotids did not participate.

Sixty per cent. of salivary calculi are said to be found in the submaxillary glands, twenty per cent. in the sublinguals, and twenty per cent. in the parotids. The stones are usually found in Wharton's duct, where they are generally round or cylindrical. When found

in the gland they are usually larger, irregular, and multiple.

Carter is inclined to look upon salivary calculi as the result of a local inflammatory process—a clump of bacteria serving as a nidus around which is deposited the salts of the saliva. The prompt removal of calculi, especially if they are located in the gland, should be urged, not only on account of the pain but because of the likelihood of abscess formation, which may result in cellulitis, a condition always to be dreaded in this locality.

[*Medical Clinics of North America* (Philadelphia number), September 1917.]

Ulcerative Endocarditis, Secondary to Dental Sepsis, Treated by Autogenous Vaccine. By Judson Daland.

The three cases which furnish the text of this clinic are those referred to by Daland in the Dental Cosmos, 1917, p. 1101.

Case 1 was a man of forty-three, complaining of weakness, mental depression, fear of crowds, tremor, irritability, epigastric distress with distention, attacks of fever at intervals of from ten to fourteen days, loss in weight of thirty pounds. These symptoms began six months ago. Family and personal history were unimportant. The maxillary left premolar and first molar and right molar were crowned. Absence of teeth on the right side prevented good mastication. By exclusion of other possibilities resort was had to radiographing the teeth. This showed periapical abscesses at the roots of the left mandibular premolar and first molar, and left maxillary second premolar. Exploration showed that the left maxillary second premolar contained cotton, offensive in odor. The root-canal was enlarged, and cultures taken, yielding a non-hemolytic streptococcus of low virulence. From this a vaccine was made. The infected teeth were extracted and the sockets curetted. The equivalent of 500,000,000 organisms was injected at intervals of five days, later increased to 750,000,000, and toward the end gradually decreased to 150,000,000. The leucocytes were increased 1000 after the first injection; the larger doses caused depression. Vaccine treatment was continued for two months and was of no benefit. Death ensued. In Daland's opinion the beginning of this fatal illness was due to septic ulcerative endocarditis involving the previously diseased mitral valves, secondary to streptococcus infection from tonsils or roots of teeth, or both. The large doses of vaccine did harm by causing increased weakness.

Case 2, male, age forty-one. During the past three or four years the patient had had abscesses about the apex of the right maxillary first premolar; he complained of feeling tired, aching pains in legs, nightsweats, fever, loss of weight, anorexia, increased pulse rate. Vaccine prepared from an hemolytic streptococcus isolated from the blood stream gave no observable benefit. The disease steadily progressed, culminating in death. The history, examination, and autopsy all combine to show that this was a typical case of septic ulcerative endocarditis, involving the mitral and aortic leaflets, and it is probable that these diseased valves became infected with the hemolytic streptococcus from the roots of certain teeth.

Case 3, male, age forty-six, complained of weakness, chills, fever, sweats. The family history was negative. Radiographs showed abscess on the distal root of the right maxillary second molar. This tooth was removed. Considerable pus escaped. Fever, leucocytosis, and polyarthritis disappeared, and there was general symptomatic improvement, but death took place twelve days later. The marked though temporary improvement following the extraction of the infected tooth suggests that greater benefit might have been secured if that focus had been removed earlier; on the other hand the periapical abscess may itself have been secondary, as the tooth showed no evidence of previous disease.

[*American Journal of Physiology*, Baltimore, March 1, 1918.]

Orokinase and Ptyalin in the Saliva of the Horse. By C. E. Hayden.

It has been claimed that there exists an enzyme, present in the buccal and possibly the lingual glands, that activates in ptyalinogen present in the secretion of the salivary glands of the horse. From this point of view neither saliva obtained from a parotid fistula nor a glycerin extract of the parotid gland digests starch. The same claimants assert that the mixed mouth secretions obtained from an esophageal fistula are more powerful

in their amylolytic action than those obtained from the mouth. The name orokinase is given to the activating enzyme which activates the parotid saliva, and the claim is made that the enzyme is present in the mouth secretions of both horse and man.

In Hayden's present work, parotid saliva from the horse was collected through a fistula of Stenson's duct. Mixed saliva was collected from both the mouth and an esophageal fistula. Mixed human saliva was obtained from a large number of persons. Parowax was chewed in each case to stimulate the flow. Various extracts were made with fifty per cent. glycerin in water.

The data and the inferences therefrom afforded by this study have been summarized by the author as follows:

(1) Pilocarpin hydrochlorid does not digest starch. Hypodermic tablets of both pilocarpin and arecolin contain a reducing substance in comparatively large quantities, but do not in themselves digest starch.

(2) Two drops of human saliva diluted 1 : 50 carry 5 cc. of a one per cent. starch solution to the erythrodextrin stage in a large number of cases. A measurable amount of sugar is produced as a result of that digestion.

(3) Human saliva in such a dilution does not activate either mixed or parotid fistula saliva from the horse.

(4) Mixed human saliva digests cooked starch much more readily than either mixed or parotid fistula saliva of the horse.

(5) Two drops of mixed mouth saliva from the horse diluted 1 : 10 does not activate parotid fistula saliva from that animal. It does not show any appreciable digestive power when used alone in that dilution.

(6) The filtrate from a solution of ground corn or oats contains a reducing sugar. The quantity of sugar does not show an average increase when the grains are digested with either mixed or parotid fistula saliva from the horse. Mixed human saliva does digest them under the same conditions.

(7) Extracts from the glands and mucosa of the mouth have failed to activate parotid saliva or extracts of the salivary glands of four different horses.

(8) Corn and oats passed through an esophageal fistula show no more reducing sugar than the ground grains themselves. Mixed saliva from the esophagus has not shown any marked potency.

(9) The glands of the mouth as well as the salivary glands produced a small amount of enzyme that will digest starch within a twenty-four-hour period.

[*Pennsylvania Medical Journal*, Athens, January 1918.]

Diseases of the Eye from Focal Infection. By Adolph Krebs.

[*American Journal of Ophthalmology*, Chicago, May 1918.]

Blepharospasm Secondary to Pyorrhea Alveolaris. By H. M. Thompson.

Krebs presents essentially seven case histories, which in a condensed form follow:

(1) Asthenopia, a woman of forty-eight years, under observation eight years. Radiographs showed periapical abscesses on both right and left maxillary first molars. These teeth were extracted. Marked improvement took place within two months, and at the present time (two years later) she can read or sew for hours without fatigue or discomfort.

(2) Asthenopia, man of thirty-seven, under observation four years. No correction was comfortable more than a few months at a time. An extensive periodontal abscess in the right maxilla was treated and cured. All ocular symptoms disappeared.

(3) Asthenopia with marginal blepharitis, woman of twenty-one, under observation three years; was cured within a month after extraction of two abscessed left maxillary molars.

(4) Episcleritis, woman of thirty-eight, under observation seven years. No treatment had any permanent effect until two teeth were extracted. This gave complete relief for one year; then a return of the episcleritis occurred. Removal of an infected tonsil was followed by a clearing up of the inflammation. No sign of recurrence was noted for at least two years following.

(5) Phlyctenular keratitis, girl of eleven, under constant treatment for sixteen months. Extraction of an infected right mandibular first molar resulted in the prompt disappearance of the hitherto incurable photophobia and the cessation of the phlyctenular process. There was no return for at least a year.

(6) Iridocyclitis, woman of fifty-five, under

observation three years. During the second year of unsuccessful treatment there was extracted an infected molar bridge abutment. Progressive improvement has since taken place.

(7) Uveitis, woman of thirty, under observation seven years. The radiograph showed an impacted and infected right maxillary third molar, also a left maxillary molar with a periapical abscess extending into the antrum. These were removed, and in two weeks there was marked improvement. During the next two months she had an attack of dimness lasting ten minutes. Her left antrum was operated upon, since which time there has been no return of the attacks.

Thompson's article is a brief case history which is in line with those just recorded. The patient was a man of fifty-two, in excellent health except for "rheumatic attacks." He first noticed a conjunctival irritation. A few days later the lids closed tightly in a tonic cramp. General examination; urine and Wassermann negative. For four weeks varied remedies were tried in vain. A rather severe pyorrhea suggested the chance of focal infection. The teeth were all removed. On the next day the patient was able to open his eyes, and on the fourth day was apparently in normal condition.

Thompson interprets the long-continued cramp of the orbicularis muscle as secondary to a toxic inflammation of all the coats of the eye, due to focal infection.

[*Annals of Surgery*, Philadelphia, May 1918.]

Loose Cartilage in the Temporo-Maxillary Joint. By Richard J. Behan.

The patient was a female, of apparently adult estate, whose chief complaint was inability to close her mouth so that the teeth would come together. It seemed that the entire mandible was swung toward the right side, so that the line of the teeth of the lower jaw was at least one-half inch from the line of the upper teeth. The lesion had been present for eight months, having resulted from a difficult effort at mastication. At first the jaw locked, but by persistent effort she was able to release it. This happened several times, until the locking in the position above described became permanent and could not be released.

A study of the joint convinced Behan that the locking was due to a separation of the left interarticular cartilage, with a forcing back into the temporo-maxillary articulating cavity.

No description of an operation for the correction of this deformity could be found, so the author devised a technique which is given in detail. The patient made an uneventful recovery, leaving the hospital in eight days. The teeth were in perfect alignment, mastication was normal. After a lapse of eighteen months, the left joint gave no trouble, although there was some crackling in the right joint.

[*American Journal of Physiology*, Baltimore, April 1, 1918.]

The Salivary Factor in Relation to Dental Caries. By Percy R. Howe and Mildred R. Keniston.

The authors report their work upon the relation (if any) between the salivary factor and the incidence of dental caries. The "salivary factor" is an arbitrary and empirical standard to represent the degree of the saliva's power to maintain a neutrality in the mouth.

Marshall's procedure was followed. All subjects were of about the same age, ten to fifteen years. From an abundance of clinical material it was easy to eliminate any doubtful intermediates, and to choose only the two extremes, those children showing absolute immunity to dental caries and those showing excessive decay.

From the observations made on these cases, it would appear that the saliva of persons with teeth immune to caries varies, as does also the saliva of persons with carious teeth; that saliva may neutralize substances taken into the mouth, and that the average immune mouth has the greater power of neutralization; but the ratio of resting and activated saliva in immune mouths does not vary enough from that of carious mouths to prove that this ratio is indicative of the production and maintenance of immunity to caries in any individual. The tables compiled do not show consistently that as the difference between the total neutralizing powers of the resting and activated saliva diminishes, liability to incidence of caries increases. Since the average ratio or salivary factor is below 80 in both immune and carious mouths, there

is doubt as to the importance of this mark in the relation of the salivary factor and dental caries. Furthermore, no constant points of difference can be found to correspond with the differences in salivary factors, and in Howe's and Keniston's work no substantial proof can be found to verify a relationship of the salivary factor to dental caries. This conclusion is in harmony with and confirms the findings of Gies and his collaborators.

[*Journal of Cutaneous Diseases*, Chicago, October 1917.]

Focal Infection in the Etiology of Skin Disease. By E. D. Chipman.

The aim of this paper is to report the observations in fifty consecutive cases belonging to those dermatoses which may be suspected of having a focal origin. For the most part it records only the incidence of focal infection in these cases. Chipman does not present this study as a protagonist. For him it is simply a preliminary survey of the field, which may later be found to be fertile or barren. The statistical method which he employs is justifiable for this purpose, and its results may be suggestive, but are never to be considered conclusive of a causal relationship between dental foci and cutaneous lesions.

A summary of this study shows that of six cases of alopecia areata five showed dental infection (long before the days of the doctrine of focal infection there was in the French dental literature abundant reference to the rôle of dental disease in the production of alopecia areata, and the earlier pages of the Dental Cosmos contain numerous notes on this subject); of two cases of chilblains each showed dental infection; of four cases of circumscribed eczema each showed dental infection; of two cases of erythema multiforme one showed dental infection; the one case of granuloma annulare encountered in this study showed dental infection; of two cases of herpes progenitalis one showed infection of the maxillary sinus; of two cases of herpes facialis each showed infection of the teeth; of four cases of lichen planus each showed dental infection; of two cases of lichen simplex of Vidal each showed dental infection; of seven cases of psoriasis five showed infection of the teeth, and one infection of both teeth and tonsils; the single case of Raynaud's disease showed infection of teeth and tonsils; each of seven cases of rosacea showed dental infection; likewise for the two cases of urticaria, the three cases of vitiligo, and the two cases of zoster.

Out of the fifty cases, thirty-five showed infection of the teeth alone; four showed infection of both teeth and tonsils; one of teeth and appendix, and one of accessory nasal sinus (maxillary).

One circumstance observed in several cases of this series merits special remark, namely, the tendency to the development of symptoms on interference with an active focus. For example, in one case of rosacea a marked exacerbation followed active treatment of an apical abscess. This, however, soon subsided, and was followed by a corresponding improvement. In one of the cases of neuritic eczema in which two apical abscesses were treated, a slight exacerbation followed the interference with the teeth. This was followed by a month in which no progress was made, at the end of which interval the condition spontaneously resolved.

Another point worthy of emphasis is that it is not necessary to find the same microorganism in the skin lesion that is found in the original focus in order to suspect the latter of being in etiologic relationship with the former.

The above paragraph, together with the central thought (anaphylaxis) of the following quotation from Chipman's article—"If we accept it as established that anaphylaxis results from focal infection we must consider it possible that the dermatoses caused by hypersensitiveness are ultimately due to focal infection"—is found in a developed form in Duke's "Oral Sepsis" (*vide* Dental Cosmos, July 1918, book review).

In the discussion which followed this paper, Sutton reported that in seventy-five of a series of one hundred cases of skin diseases specifically studied, there was marked improvement or complete cure after removing the focus of infection, *e.g.* a case of lichen planus labialis was cured, sequent to the removal of several apical foci. Another case was that of a chronic eczema which failed to respond to any treatment until the mouth had been put in a healthy condition. Sutton and his colleagues, in cases where simple re-

moval of focus failed in results, resorted to autogenous vaccines.

R. A. Davis reported an obstinate case of dermatitis herpetiformis. The patient was treated with emetin for pyorrhea alveolaris, and the skin lesion healed immediately. Since then he has had the same experience with six or eight similar cases.

Engman spoke of a case of superficial gangrene of the fingers and gangrenous spots on the penis with Raynaud's phenomena of both hands and feet. The patient disappeared. Nine years later he returned with toenails extracted and finger-nails scarred, still having some trouble. For twelve years he had had a constant virulent intermittent oral infection. This was cleaned up. Immediately all of his objective and subjective symptoms disappeared.

Morrow mentioned a case of eczema of face and neck of many years' duration. Radiographs showed many apical abscesses. A few hours after the extraction of the teeth the man felt much better. A few days later the rash had almost disappeared. In the course of a few weeks the eruption entirely vanished.

Heinmann reported a case of a man age sixty, with typical pityriasis rubra of the Hebra type. His teeth were in a very bad condition. These were extracted, and within two weeks the man was well and had been well since (three years from the time of the extraction).

Hartzell of Philadelphia spoke of a man with a severe pustular eruption on the palms of both hands and other symptoms. The antrum was found to be infected. After thorough drainage his symptoms began to subside. Slowly but certainly they disappeared.

[*Medicine and Surgery*, St. Louis, February 1918.]

Fibroma of the Tongue, with Consideration of Other Tumors of the Tongue and Certain Technical Points in Tongue Resections. By John W. Churchman.

Although a lingual growth usually is identified as a fibroma or a cyst, a tuberculous or a syphilitic granuloma, or a carcinoma, Churchman presents a list of twenty-two types of newgrowths of the tongue which have been reported in the last twenty years.

A fibroma is in a way a rarity. It may resemble a cyst, but the chief difficulty which it presents is that of excluding sarcoma. Often this requires the utmost care, even in the study of microscopic sections.

Churchman's case here reported concerns a man, forty-four years of age. The growth was first noticed two months before admission to the hospital. There were no unpleasant symptoms. The growth was removed by a wedge-shaped incision, done between stay sutures. Convalescence was uneventful; the tongue functions perfectly.

As regards the technique of operations on the tongue, experience has taught the author —(1) Never to touch the inside of the mouth with a knife. The entire resection of the tongue and floor of the mouth is done with a cautery. This, combined with the stay sutures, eliminates hemorrhage. And (2) Where malignance is suspected, to remove the tongue by the jaw-splitting operation, preferably two to three weeks after a complete and very radical dissection of the glands on both sides of the neck, and after these wounds have been allowed to heal.

[*Surgery, Gynecology, and Obstetrics*, Chicago, July 1918.]

Mixed Tumors of the Salivary Glands: A Study Based on the Experimental Production of Neoplasm in the Submaxillary Gland of the Dog. By Alexander Fraser.

This is a broad and judicial consideration of the subject. There are a number of valuable illustrations, which are well reproduced.

Fraser describes briefly the principal theories of the origin of these growths, and then proceeds to report an experimental study of the morphological reaction of the salivary glands to injury, which was undertaken with the object of observing the regenerative changes on the part of the salivary epithelium, and whether the character of such changes would serve to establish any definite clue as to the origin of the mixed tumors.

Frazer summarizes and discusses this work as follows:

(1) The mixed tumors arise from the ducts of adult glands. No claim is made that true neoplasm has been experimentally produced, but the experimental results justify the con-

clusion that the primary structures of the mixed tumors may easily arise from the ducts of the adult gland.

(2) The endothelial theory has no foundation in fact. All the so-called endothelial structures are easily explained as natural modifications of primary duct formations.

(3) Injury, such as localized or partial obstruction of ducts, probably plays a prominent part in the origin of these tumors.

(4) The cartilage is developed from the epithelium of the parenchyma of the tumor. This claim will undoubtedly meet with strong opposition.

PERISCOPE

Chinosol in Root-filling.—Root-canal fillings that are to be radiographed will have a denser outline if chinosol is incorporated with chloro-percha, and pumped into the canal before inserting the point. Chinosol being a good antiseptic is particularly indicated in canals that have been putrescent.—VICTOR H. FUQUA, *Dental Review.*

Method of Polishing Vulcanite or Metal Plates.—After filing and scraping, use a leather washer (the same as is used for the ordinary water tap) on the lathe in conjunction with equal parts pumice and emery powder (knife polish). This quickly takes out all scratches without the use of sandpaper. Proceed then with the brushes in the usual manner.—*Oral Health.*

To Obtain Smooth Finish on Palatal Surface of Vulcanite Dentures.—After the case has been invested, separated, and the wax boiled out, paint the cast with liquid silex. Allow to dry thoroughly before closing the flask. This eliminates the burnishing of tin foil, which tends to wrinkle and tear during the process, resulting in a rough and unsightly finish to that part of the denture.—LESTER N. ROUBERT, *Dental Review.*

Pulpless Teeth.—The writer does not agree with the oral surgeon who radically condemns every pulpless tooth; on the contrary, he knows it is possible, if the patient will present in time, to remove the pulp and aseptically fill vital root-apices, in a large percentage of such teeth, with no post-operative periapical infection, a fact which can be established radiographically and by cultural tests; but he does not believe that an infected or abscessed root apex should be retained for a minute, nor would he spend that time on one, unless attempting apiectomy.—CLARENCE J. GRIEVES, *Journ. N. D. A.*

Removing Silver Nitrate Stains.—Many times, even though one may be very careful, a little silver nitrate will fall on the hands of an operator and cause a great deal of discoloration and also discomfort in operating. When this happens, soak the hands for about fifteen minutes in water as hot as one can stand, and then very carefully rub the spots with pumice stone. The spots will be seen to disappear without any injury to the part treated. After the black color caused by the dead skin entirely disappears, soak the hands in almond cream. Very large spots may require a few treatments at short intervals before the black color entirely disappears.—W. E. WHITTAKER, *Dental Review.*

Root Surgery.—To skilfully perform root surgery requires a perfect technique, plenty of time, and the utmost delicacy of touch in the use of the instrument, so that one may know by the feel of the blade just when the infected peridental membrane and outer layer of cementum has been removed. Our fingers must be our eyes, as we are working in the dark, but even so, there is no more need of mutilating a tooth with a plane than there is of mutilating it with a bur or any other instrument, and only the careless operator will do so. With this instrument the healing is accomplished by hyperemia, induced by the trauma of the operation, and no medicine is used.—EDWARD A. ROYCE, *Dental Review.*

To Hold a Fractured Jaw for Impression and Adjustment.—In all articles on fracture of the jaw, there seems not to have been given the most accurate way of taking a successful impression. Make rather loose-fitting bands of regulating strip of about 36 gage or Liberty (*née* German) silver 38 to 40 gage to cover two teeth on each side of the fracture, solder each pair firmly together,

and then accurately align the edges of the teeth at the fracture with the bands slipped on; then hold the two sections of bands in line with sticky-wax, remove, solder them together, and cement into place for a permanent splint. This will allow you to take an impression or do any other work necessary, without pain to the patient, and with greater assurance of success than by sawing the model and trying to adjust fragments.—*Dental Summary.*

The Interproximal Contact Point.—The form of the contact point has much to do with comfortable mastication and the preservation of normal gum in the interproximal space. The contact point on normal human teeth is a small curved eminence on the proximal surface near the occlusal or incisal. From this small contact the proximal surface of enamel slopes away more or less abruptly, leaving the area in actual contact exceedingly small. This holds true of broad teeth like the molars as well as of narrow teeth like the incisors or cuspids. The philosophy of this narrow contact relates to the fact that when food is forced between the proximal surfaces of the teeth, as it will be at times, it is not retained there owing to the limited area. If the contact were broad, as we sometimes see it on fillings, food particles would be held between the teeth, leading to all the evils associated with this condition.—C. N. Johnson, *Dental Review.*

Cancer of the Mouth and Face.—Medical research has established the fact that cancer is a local disease at its beginning, and that every case might be cured if treatment (operation) were performed early enough. And what is true of cancer in general is especially true of cancer of the mouth and face. Bloodgood has shown by his experience that an early diagnosis and prompt radical treatment will cure eighty per cent. of such cases, and states that this number may be increased to one hundred per cent., if the diagnosis is made sufficiently early. As has been stated by Means and Foreman: "The operative technique of tumors of this region has reached a high state of perfection, and if further advance is to be made against cancer of the buccal cavity, it must be by the earlier recognition of the disease." There is, then, a grave responsibility placed upon the person first seeing these cases, and this person in the natural course of events is frequently the dentist.—Ernest Scott, *Dental Summary.*

Extracting Diseased Teeth.—It is the common practice among many to extract diseased roots, and leave the wound socket to nature to take care of. In the writer's experience this practice is not only non-surgical, but really of harmful result. When the pulp of a tooth-root becomes diseased, and is not treated properly, the bacterial toxins pass upward into the periapical space, and cause dissolution of those subdental tissues. The radiograph discloses in such cases marked radiopacity, representing cystic degeneration and carious destruction of the alveolar tissues. Obviously the removal of the diseased root or roots cannot remove this tissue. The apical granuloma and the subapical alveolar structure must be removed by surgical curetment, and the socket packed for some time in a series of post-operative visits. By this means alone can the oral surgeon hope to remove whatever vestiges of infected tissue may be remaining to pour their insidious toxins into the blood stream and into the lymphatics to attack the weakened and non-resisting tissues elsewhere in the economy, be they lymph nodes or glands, intestinal lining, or myocardium.—Millel H. Feldman, *Dental Summary.*

A New Method for Making a Porcelain Crown.—The following described new method for making a porcelain crown will be found to be very practical for bicuspid and molar roots, and especially adapted for short-bite cases when a gold crown would not be desirable. Make a coping with one or two posts, according to the requirements of the case. Then, having the coping placed on the root, take an impression and a bite. Make models and adjust them in an articulator, then remove the coping from the model, and solder a strip of gold plate around the coping on three sides, namely, mesio-proximal, lingual, and disto-proximal, having the gold strip wide enough to reach to, or nearly to, the occlusal surface of the crown as it will be when finished. Then, having selected a facing of the proper shade and size, solder the pins of the facing to the post of the coping. Then make a mix of synthetic porcelain of a shade to match the facing and fill it in upon the coping, which, having three side walls of gold and the facing as a buccal wall, sustains the synthetic porcelain at every point. While the synthetic porcelain is soft carve it to an approximal occlusion with the antagonizing tooth in the articulator, and when fully hardened grind and polish the porcelain to a proper occlusion.—H. A. Cross, *Dental Review.*

School Clinic at North Tonawanda, N. Y.—At the Payne Avenue school in North Tonawanda a free dental clinic has been opened in connection with the free dispensary which has been maintained at this school for a long time for the examination of school children and for operations on the nose and throat. The free dental clinic has been made possible by the donation of funds from some of the philanthropic people of North Tonawanda, and the Council has promised the Health department that if the clinic proves successful they will put a sufficient sum in the budget next year to continue it in operation. The dispensary has a capacity for four patients (beds), and many operations are done on the nose and throat, removing tonsils, adenoids, etc. The little patients are kept at the dispensary for one day and then taken to their homes. Mr. R. A. Searing, superintendent of education, has been largely instrumental in bringing about this much-needed institution.—*Health News.*

Taking a Bite for Crown or Bridge Work.—One of the most difficult items to contend with in operative dentistry is the taking of a satisfactory bite, particularly where the occlusions are close. When the wax or compound bite is removed it often breaks in two pieces, making it difficult to obtain a perfect cast for the occluding surfaces to be articulated to the crown or bridge about to be constructed, or it breaks when placed on the plaster model. Many ideas have been advanced for overcoming this, such as placing a piece of linen, cut about the length and width of the bite to be taken, then placing the wax above and below the piece of linen, taking the bite in the usual manner. The linen holds the bite together and prevents biting clear through. A better and more rapid way of obtaining this result is the use of the Articu-bite, a little instrument in which all manner of hard, close, difficult articulations and bites can be obtained in two minutes' time without the possibility of a mistake.—W. E. Beachley, *Dental Review.*

Dietetics and Oral Hygiene.—Associated with an appreciation of the true functions of the saliva and mucus there goes the important dietetic principle or precept that the physiologically correct type of meal is of such a nature or so arranged that it will leave the mouth physiologically clean. I have never as yet come across any physiologist or medical man who has dared to say that the meal should be of such a nature or so arranged that the mouth and teeth will be left dirty. Yet their precepts and practices would rather indicate that they have a preference for such types of meals. It may be contended in the future that the types of food which we dentists indicate as leaving the mouth and teeth clean or otherwise are not correct in all details—possibly they may not be. Nevertheless we have established a most important principle which was overlooked in the past, and is not at present taught by physiologists. There was something pardonable for dentists in their old injunction to brush the teeth after every meal, for they knew that when the dictates of dietetic specialists were carried out, the mouth, as a very general rule, did require some artificial form of cleaning. It is relatively unpardonable for physiologists not to recognize or to have recognized that the mouth is naturally kept physiologically clean, and should not, under a proper dietetic *régime,* require the teeth of man to be brushed to keep them healthy.—J. Sim Wallace, *Dental Record.*

The Clasp as an Anchorage for Partial Dentures.—We have been using clasps ever since practically the advent of dentistry. It is one of the oldest types of means of retaining partial artificial dentures, and strange to say, today it is the most abused plan of supplying partial artificial dentures. It is one of the most universal means of anchoring partial dentures, and for that reason it should be better understood than any other system of anchoring partial dentures, but strange to say, as I have said, the least understood and the most abused system. If you have taken the pains to study these conditions, as possibly I have done more than some of you, if you will only go into the laboratories in the cities and study the impressions that come to these laboratories from the profession generally, with the request to make a partial artificial denture, you will be surprised. Beeswax impressions, beeswax combinations of bites are taken and sent to the laboratories with the request for a partial removable denture of some kind. Is it any wonder that we are receiving the bitterest condemnation of this work? Is it any wonder these appliances are the means of destruction of the natural teeth and their surrounding tissues? The wonder is that they do not cause more destruction than they do. The clasp, to my mind, is an attachment that can be used and should be used in the great majority of cases. As I have already said, there are many instances where these complicated pieces of work are possible, or no doubt indicated, and

may be used to great advantage; but the great mass of these cases, gentlemen, are cases that do not call for this class of work, and we had better spend our time and put forth our efforts in the mastery of the simple forms of clasps that we can use in anchoring these appliances.—F. E. Roach, *Journ. N. D. A.*

Prosthesis for Oral Mutilations.—In studying the illustrations of cases treated by dentists in the great war we have noticed the very complex appliances that have been used in many cases, and the suggestion has come to us that a simplification of the technical forms would be desirable if the requirements could be met. Many of the dentists who are taking up this war work are inexpert as technical prosthetists because of lack of experience, and besides they have had little occasion to study the phenomena involved, so that they could not have any very well-defined ideas of the principles involved in designing and constructing suitable appliances for these entirely new conditions. The fundamental objectives to be kept in view are the restoration of the functions of mastication and speech, and so far as may be practicable, of normal facial contour.

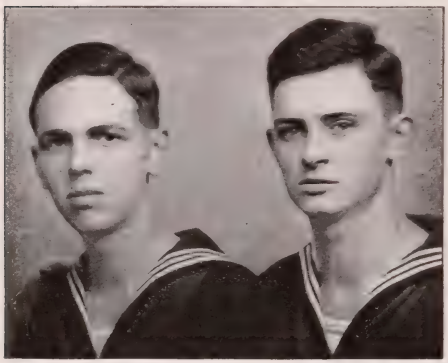
Probably the most difficult technical problem will be to secure stability of the appliances that shall make functions practicable. In some cases the tissues are badly mutilated, and in many cases scar tissue from healing wounds has not only changed the usual form of the oral structures, but has produced conditions which make it difficult to adapt any of the usual forms of prosthetic dentures. Many or all of the teeth and large sections of the jaw-bones are often missing from gunshot wounds or because of the surgeon's operations, and the remaining tissues are of such character and condition that little form or surface remains to which definite anchorage may be attached. What is still more troublesome is the fact that the muscles of mastication are destroyed by the wounds or by paralysis, so that the harmony of masticating function is badly deranged. The physics and mechanics as well as the functional requirements should be worked out together, as no real success can be predicted without harmonious control of all the forces involved. It may be that it will be time enough to meet this problem when our wounded soldiers return, but in the meantime it would seem that it would be wise to begin some serious study of this problem, that we may save our men from the inconvenience of lack of function, or the embarrassment of personal disfigurement.—*Dental Register.*

Maintaining Dryness of Gingival Cavities Without Rubber Dam Especially Useful with Silicious Cements.—The cavity having been prepared with retentive form, apply deliquesced chlorid of zinc, full strength, under the border of the gum margin all around the decayed tooth, also under the gum margin of the adjoining tooth on each side. A suitable cotton-wound broach is best for the purpose. It must be done carefully, so as to produce no hemorrhage. Lip or cheek must be held away to prevent contact with chlorid. It is best to keep the saliva ejector in the mouth from the beginning. After the application is made, the surfaces touched with the chlorid must be at once sprayed, preferably with tepid water, to wash off the chlorid. The momentary contact with the tissues suffices to produce the required astringent effect. Special care is necessary that no chlorid remains in or around the cavity, as it would contaminate a silicious filling. A cotton roll is now inserted and alcohol is applied to cavity, teeth, and gums, and all dried with cotton and blasts of warmed air. It will be found that cavity and surrounding tissues are dry and there is no oozing from gum margins. This dryness can be maintained fifteen or more minutes, changing the cotton roll if necessary. If the filling is to be silicious, all materials and instruments should be within reach before applying the chlorid. After drying as above, the necessary powders and liquid are placed on the slab. mixed, and the cavity filled. Coat filling with cocoa butter and allow time for hardening before removing the cotton roll and saliva ejector. It is best to finish the filling a day or more after insertion. If sufficient excess of cement has been used, cocoa butter is adequate protection, as there is not penetration of moisture through the excess sufficient to affect the finished filling. The brief application of chlorid produces no injury. Should any of it get where it is not wanted, apply plenty of water, which will destroy its caustic effect. Should a slight hemorrhage be produced in working on the cavity, the application of the chlorid as directed will generally stop it, so as not to delay the operation. This method is practical with all gingival cavities, except those on the lingual surfaces of the lower bicuspids and molars. Therefore it is also useful in insertion of amalgam fillings.—Vincent Fischer, *Dental Review.*

OBITUARY

Leon VanderWhite—W. Reinoehl.

I WOULD like to invite the attention of the dental profession to the first martyrs to the cause of liberty in the United States Navy during the war with Germany. The inclosed postal card was given to me by my friend and assistant, Leon VanderWhite, pharmacist's mate, 2nd class, just before he embarked upon the U. S. S. Cyclops for the United States. As you will remember, the Cyclops has gone to the port of missing ships, and as nothing



W. R. L. V-W.

has been heard of her for about four months it is but fair to assume that she went down with all on board.

The other picture is of his chum and classmate, W. Reinoehl, pharmacist's mate, 2nd class, who accompanied him home on the same vessel. These gallant boys at the outbreak of hostilities with Germany promptly enlisted in the U. S. Naval Reserve Force, and were assigned to duty aboard a large vessel of the navy. At the time of enlistment they were freshman dental students in the San Francisco College of Physicians and Surgeons, and their class enlisted almost to a man.

After a period of training aboard the vessel I was on, VanderWhite was assigned to duty with me in the dental office, and was rapidly promoted through the grades of hospital apprentice, to hospital apprentice 1st class, then to pharmacist's mate, 3rd class, and finally to 2nd class, and had just been recommended for first-class rating. Personally, there was no more likable man on the ship, and he was as reliable and faithful in the performance of duty as was humanly possible. Several times he has told me that he had worked until one or two o'clock in the morning to get the office ready for inspection. This was purely voluntary, and shows the zeal with which he performed this and other duties devolving upon him.

No man can give more than his life for his country. He gave his, willingly volunteering when he knew that at any time he might need to make the great sacrifice. Let the dental profession pause a moment and ponder the bravery of these lads, who died that their country might live.

W. Reinoehl, pharmacist's mate, 2nd class, was likewise a fine young man, who did his duty in every respect, and was equally faithful in the performance of duty, but he was not directly associated with me, and I only knew him as a friend of VanderWhite's, and by his excellent reputation.

I am, sir, your obedient servant,

J. D. HALLECK,

July 1918. *Dental Surgeon U. S. Navy.*

Dr. Ammon Osgood.

DIED, August 10, 1917, at his home in Bath, N. Y., from kidney affection, in his eighty-fifth year, Dr. AMMON OSGOOD.

Dr. Osgood was born at Wells, Bradford county, Pa., September 17, 1832, the son of George M. and Mary (Osborne) Osgood. His early education was obtained in the district school of Wells, and at the age of twenty-four he took up the study of dentistry under

the preceptorship of Dr. Louis Eaton of Elmira, N. Y., with whom he remained until 1863. In 1863 he removed to Bath, N. Y., and established himself in the practice of his profession, which he continued up to the time of his death.

DR. AMMON OSGOOD.

Dr. Osgood was a mild-mannered, gentle, lovable man, content with living a simple life. He was generous to a fault, faithful in all his dealings with his fellow men, and highly respected by his patients and his townsmen in general. Dr. Osgood was what might be called a first-class all-round country dentist of the old school. Soon after establishing himself in Bath, Dr. Osgood's health became impaired, and he was compelled to give up his active practice for two years, which time he spent in outdoor work. With partly restored health he again took up practice, but was never able to follow a strenuous life, for the reason that his health was always below normal, and he was compelled to conserve it.

He was, however, so successful in this respect that he was enabled to practice his profession for sixty years.

Dr. Osgood was a member of the National Dental Association, the Dental Society of the State of New York, and the Seventh District Dental Society of the State of New York, serving the last-mentioned society as president for the second time at the time of his death.

He was married on December 6, 1865, to Miss Emma Wintermute of Hammondsport, N. Y., who with his brother, Edmund O. Osgood, survives him. Dr. Osgood's remains were buried in the city cemetery of Bath, N. Y., on August 13th.

Dental College Commencements

Dalhousie University.

The convocation of the Faculty of Dentistry, Dalhousie University, was held in Halifax, N. S., May 30, 1918.

The degree of Doctor of Dental Surgery was conferred on the following graduates:

John H. Adamson
Lindsay M. Finnigan
Guy N. Stultz

Tulane University, School of Dentistry.

At the commencement exercises of the School of Dentistry of Tulane University, held in New Orleans, La., the degree of Doctor of Dental Surgery was conferred on the following graduates:

James W. Andrews
Joseph F. Bertucci
Thomas G. Biggs
Joseph T. DeBella
Earl G. Eastin
Haim Gittelman
Marion F. Jarrell
John B. Lescale
Robert S. McKeithen
Henry L. Magee
Marian S. Mayer
Theophile M. O'Ferrall
Henry L. Robinson
John B. Robinson
Aldes Rozas
Wilbur D. Trellue
Oscar A. Wolfe

University of California, College of Dentistry.

At the annual commencement exercises of the College of Dentistry of the University of California, held in San Francisco, Calif., on May 15, 1918, the degree of Doctor of Dental Surgery was conferred on the following graduates:

Cedric C. Baronidis
Elmer H. Berryman
Chester G. Butler
Ward G. Cadwallader
Clyde C. Carmean
Chas. W. Craig
James S. Craig
Leon G. Cuenin
Paul Ehorn
Francis W. Epley
John H. Frank
Harry E. Frisbie
Reuben A. George
George A. Goff
Murray H. Groves
Frederick H. Hare
William H. Haskins
Louis R. Hinck
Chester W. Johnson
Otto R. Jungermann
Ernest R. Ker
Carl E. King
Tokutaro Kogure
Matthew Lifschiz
Philip T. Lynch
Leon W. Marshall
Earl H. Mathis
Theodore H. Pohlman
Carl P. Rapp
Leslie H. Reardan
Harris E. Ridenour
Sam J. Roberts
John F. Robertson
Carlton W. Shepherd
Arthur C. Stabler
Emil Stern
Thomas E. Tilden
Chalmers E. West
Sylvan E. West
Roy O. Williams
John L. Wood
Tamotsu Yatabe

Harvard Dental School.

At the annual commencement exercises of Harvard Dental School, held in Cambridge, Mass., June 1918, the degree of Doctor of Dental Medicine was conferred on the following graduates:

Salim Y. Alkazin
Abraham J. Batal
Louis R. Branchaud
Harry D. Brice
Harry A. Burns
Raymond P. Cassidy
William J. Clancy
Bernard B. Cohen
John W. Cooke
Paul W. Crouch
Charles A. Cushing
Harold B. Cushing
Benjamin Daniels
Dewey S. Darling
Frank W. Davidson
Hazleton B. Davis
George E. Farrell
L. M. Fine
Isadore Flink
Louis M. Forbes
Jacob J. Glazin
Wilfred C. Granger
Myron E. Hale
Gordon Hall
Orvar J. Hammond
Philip N. Harris
Allan M. Johnson
Paul H. Karcher
Harvey E. Kimball
Paul B. LeBaron
Harold C. Lockwood
Neil F. MacDonald
George D. Malkasian
Carl W. Maxfield
Francisco C. Monteagudo
John H. Nugent
Jack B. Penn
Frank I. Rhodes
Harold C. Robinson
Alexander Samuels
Paul A. Schwartz
Alfred E. Sears
A. E. Segal
Hermon A. Shohet
Clifton A. H. Smith
Paul R. Smith
Harold G. Spooner
Geo. A. Staples
Arthur F. Sullivan
Harold E. Tingley
David F. Wallace
Henry F. Weston
Paul L. Willson
Roland J. E. Woisard
Benjamin F. Yavner

University of Illinois, College of Dentistry.

At the annual commencement exercises of the College of Dentistry of the University of Illinois, held in Chicago, Ill., the degree of Doctor of Dental Surgery was conferred on the following graduates:

Oscar Achinelly
Bernard R. Allen
James H. Allgeier
J. Bertram Arneson
Abraham K. Bashur
Stanley C. Bell
Chester P. Bellan
Austin T. Breyer
Orville C. Briggs
Clyde W. Brown
Rowland H. Campbell
Gerald R. Collins
Burr R. Crockett
Norris L. Cunningham
Albert R. Dippel
Arthur S. Drea
Isaac H. Droher
Chester D. Dursema
Edwin O. Erickson
Mac C. Fellows
Charles B. Freeman
Albert Gaviria
Francis L. Gorman
Norman O. Hewitt
Alfred J. Ketterhagen
Oscar R. Korsbrok
Lucian C. Keozynski
Max H. Krost
Herman D. Lasker
Carlyle W. Masters
Clayton J. Moore
Chauncey E. Motlong
William D. Olson
Jesse S. Owen
Benjamin G. Pyle
George S. Reed
William Rosenthal
Edmund H. Savage
Myron J. Senty
Robert C. Shaver
Charles L. Smith
Paul Sproberger
Frederick H. Starrett
Jacob H. Stillerman
James W. Stubbs
Harry A. Teter
Ashley T. Thomas
William E. Turner
Robert E. Wilder
Alfred H. Wood

College of Physicians and Surgeons.

The annual commencement exercises of the Dental Department of the College of Physicians and Surgeons were held June 6, 1918, in San Francisco, Calif.

The degree of Doctor of Dental Surgery was conferred on the following graduates:

John V. Buckley
George W. Castle
Harwell W. Coale
Daniel F. Cronin
Sidney F. Danne
Frank P. Denham
Edward E. Driemeyer
William H. Eckman
Lauren J. Ennis
Abe Epstein
Kenneth T. Fergusson
Eugene F. Fountain
Victor J. A. M. Goria
Eugene M. Graham
Herbert E. Grieb
Riccardo Grosso
Charles I. Hamilton
Albert B. Hanson
Francis J. Herz
Eric M. Horner
Christian Imsland
Takeshi Inukai
Buron D. Kelley
Charles S. Knoles
Edmund J. Leach
Conrad H. Lindner
Charles W. Lyman
Francis A. McCabe
Floyd M. McCord
Francis J. McQuaid
Howard H. Mentz
Alexander G. Middleton
Yoshimatsu Nakata
Cyrus Needles
Warren G. Overpack
Glen G. Patton
John H. Peschong
Clifford H. Porter
Max Rabinovitch
Russell W. Rogers
Pauline Schaefer
Joseph C. Schneider
Charles M. Silk
John B. Snell
Leo P. Stegeman
Leonard H. Stone
Vernon A. Usher
Elmo L. Walsh
Paul J. Ward
Irving C. Wells
Arthur R. Wienholz
Harry E. Wilson
Joseph E. Wilson

Colorado College of Dental Surgery.

At the annual commencement exercises of Colorado College of Dental Surgery, held in Denver, Colo., the degree of Doctor of Dental Surgery was conferred on the following graduates:

Joseph N. Anderson
William H. Basher, Jr.
Ellis J. Baskin
James E. Bell
Thomas B. Brattobo
Charles J. Brown
George F. Brown
William J. Carlson
Marion B. Case
Hung P. Choy
Raymond J. Clark
James R. Cooper
Frank C. Daniels
Oliver H. Devitt
Rex T. Ellington
Lloyd F. Emal
James G. Enright
Alonzo L. Faulk
Henry J. French
William M. Gilmore, Jr.
Galen R. Goodson
Roy M. Gordor
Edwin L. Green
Grant Gregorson
Wilbur B. Hards
Christian V. Hope
Mary W. Hotaling
Eugene C. Kettner
Theodore L. Kozitza
Frederick S. Kurtz
Chester A. Law
John C. Lee
Earl H. Lighthall
Donald F. Lyon
William R. McCalla
Roy McConnell
Fred A. McDaniel
Wilbert L. MacKenzie
Willie I. Mahurin
George E. Mallott
Gladys E. Mason
Irving W. Mason
William F. Mart
Ernest E. Monson
Jacob M. Morris
Harold E. Nelson
Chester I. Newlin
Oscar W. Overhuls
Leslie K. Painter
Archie L. Patterson
Hugo E. Peterson
Clyde H. Peach
Norton L. Rinehart
Donomon Sakamoto
Eddie C. Scharman
Stuart C. Scoulor
William H. Snoddy, Jr.
Harry Tracy
Russell P. Tulles
Jay E. Wheelock
Clifford F. Wiggins
Arthur R. Williams
Oral B. Wilson
Edmund S. Wosnik

Chicago College of Dental Surgery.

At the annual commencement exercises of the Chicago College of Dental Surgery, held in Chicago, Ill., the degree of Doctor of Dental Surgery was conferred on the following graduates:

E. E. Akan
G. W. Akerly
R. D. Anderson
H. Arai
D. H. Ascher
G. Ardery
J. M. Barker
M. C. Baron
S. Barton
E. Baum
M. D. Baxter
P. Bazer
F. Berg
L. G. Bennett
W. K. Bingaman
G. W. Blaha
J. C. Bolin
E. C. Bollinger
C. H. Brandau
O. A. Brehm
M. D. Bringhurst
D. P. Broadbent
V. J. Brookes
A. C. Brown
W. N. Brown
E. J. Butler
W. Calkins
H. C. Carlson
R. A. Case
M. Caslow
C. E. Chamberlain
K. L. Chang
H. P. Chapman
W. G. Christoph
C. Clarno
E. W. Clusman
A. G. Coplon
G. Crabtree
C. B. Crouch
L. Dannewitz
H. L. Davis
S. Demski
R. A. Denholm
A. C. Doe
H. L. Dorland
M. N. Duxbury
B. Dvorkin
F. Dyson
A. H. Finke
F. G. Fisher
T. G. Fisher
E. R. Foutz
E. C. Fox
H. Freidinger
J. Garcia
J. C. Gedstead
L. Goldstein
C. A. Goode
S. Gordon
M. H. Gouse
C. G. Green
J. W. Green
S. Greenberg
M. Greenstein
P. F. Grimm
J. A. Grinde
E. N. Hahn
H. E. Hanson
R. P. Hanson
J. D. Hardin
F. S. Harris
C. M. Haug
O. A. Helmer
J. O. Hitz
J. Holtz
D. L. Horton
J. Y. Hurdle
F. A. Hussey
K. Ikeda
F. A. Jana
A. P. Johnson
E. M. Jones
W. E. Jones
M. B. Kane
M. M. Kaplan
I. I. Kaplin
C. H. Kellam
F. O. Kimble
P. C. Knoppe
A. J. Koch
S. A. Kowen
L. Kudulian
M. E. Landis
A. R. Lauraitis
A. S. Lepak
M. L. Levin
L. Liberfarb
M. Lipschutz
J. B. Lundahl
L. T. Maas
B. Mach
F. B. Mahan
J. A. Marshall
J. J. McCarthy
M. McMillin
L. H. Mendoza
C. B. Merrihew
B. Miller
M. O. Mortrude
G. Murphy
C. M. Musser
N. Nechtow
J. E. Nelson
W. A. Niemi
H. O'Dell
G. R. Olfson
F. J. Padt
Willis Parr
B. Pawlowski
A. Phillips
L. Postiglione
L. Quint
J. Raklewicz
S. Rakow
J. Rasmussen
H. A. Reid
W. D. Rice
J. J. Reilly
H. E. Roberts
J. P. Robinson
J. Robinson
K. H. Robison
B. Rodin
B. J. Rosenthal
L. N. Roubert
N. R. Rubin
M. Saito
T. F. Salisbury
L. T. Sanborn
A. A. Savage
E. Schachter
H. Schaefer
C. Schlosberg
O. Schnitzer
M. Seidenberg
R. G. Sewell
E. Shefte
H. D. Shields
B. Siegel
B. Siml
G. B. Skinner
T. A. Skinner
H. H. Skolnik
W. L. Spencer
S. Spira
A. H. Stein
R. R. Stewart
N. A. Stone
R. J. Stone
C. L. Straith
P. D. Straup
E C. Stupka
E. R. Swenson
N. Tacij
I. Tashiro
C. Tesche
F. Thompson
R. A. Thorpe
I. Trossman
E. F. Trost
R. A. Trovillion
F. E. Turnbaugh
L. M. Venable
G. H. Waldron
C. H. Walker
E. H. Wallace
J. J. Warczak
J. T. Warner
O. M. Weber
H. Weinfield
G. R. Weisz
F. A. Wertz
J. M. Whitney
A. Wilson
L. Wineberg
V. M. Winter
E. Wojahn
J. Wojtalewicz
M. R. Woolley
J. C. Yates

Medical College of Virginia, College of Dentistry.

At the annual commencement exercises of the College of Dentistry of the Medical College of Virginia, held in Richmond, Va., the degree of Doctor of Dental Surgery was conferred on the following graduates:

W. A. Bagley	E. C. Choate	Walter Liles	J. G. Pool	H. W. Sherman
H. S. Beeks	E. C. Dickinson	L. M. Massey	J. A. Remine	M. M. Sherman
W. J. Brown	D. Q. Hicks	M. W. Miller	C. C. Sawyer	P. L. Snuffer
W. I. Carpenter	G. W. Holliday	N. F. Muir	A. L. Seay	G. A. Svetlik

---

University of Minnesota, College of Dentistry.

The annual commencement exercises of the College of Dentistry of the University of Minnesota were held in Minneapolis, Minn., in June 1918.

The degree of Doctor of Dental Surgery was conferred on the following graduates:

O. H. Abrahams	L. I. Gilbert	J. G. LaFreniere	H. B. Ness	A. F. Simon
A. W. Albrecht	I. O. Gullings	V. G. Lauer	I. H. Northfield	C. E. Snyder
C. O. Anderson	Gudrun Gunderson	C. W. Lee	F. C. Obermeyer	V. H. Storberg
E. J. Anderson	W. V. Hagberg	E. T. Lee	R. C. Olson	H. G. Swennes
G. R. Anderson	E. T. Haugberg	A. E. Lucian	C. W. Passer	C. R. Swenson
R. H. Anderson	G. J. Hiebert	J. A. McGinn	W. H. Pattridge	H. E. Thomas
I. S. Beckenstein	R. M. Hoitomt	W. H. McKinny	E. H. Pearson	I. J. Thornby
F. P. Brady	A. F. Homme	L. F. Meacham	J. A. Peterson	H. A. Thorson
G. A. Brandenborg	G. A. Johnson	O. A. Melander	L. C. Peterson	W. R. Wachtler
W. V. Buck	Harvey Johnson	C. L. Miner	E. W. Plonty	H. W. Wellman
M. H. Carlson	H. E. Johnson	Louis Moos	L. R. Priske	C. O. Werner
G. J. Dwire	R. E. Johnson	E. G. Nash	G. L. Robb	S. G. Williams
C. L. Eklund	C. W. Kelsey	J. O. Nellersoo	S. J. Roelike	H. S. Woodruff
N. A. Faus	F. K. Kirkpatrick	C. W. Nelson	W. S. Shaw	L. F. Woods
R. L. Finnegan	V. L. Kirkpatrick	J. W. Nelson	V. L. Silver	E. Zimmerman
C. R. Flandrick				

University of Southern California, College of Dentistry.

The commencement exercises of the College of Dentistry of the University of Southern California, were held on Thursday, June 6, 1918, in the Shrine Auditorium, Los Angeles, Calif.

The commencement oration was delivered by John W. Hancher, D.D., LL.D.

The degree of Doctor of Dental Surgery was conferred by the president of the university, George F. Bovard, A.M., D.D., LL.D., upon the following graduates:

H. H. Alvarez	S. Ballinger	Arthur J. Hook	J. W. McElwee	M. Stilbolt
H. S. Adair	W. J. C. Buehren	L. C. Houghwout	N. Nicholson	E. E. Scholz
M. Arnot	J. W. Carson	P. Holubek	E. S. Packard	R. B. Stevenson
G. K. Brandriff	A. A. Cobb	H. J. Hill	C. R. Pierce	M. H. Thompson
H. M. Barnhart	H. P. Duey	M. S. Haycraft	L. Perner	E. J. Thee
C. M. Beebe	O. C. Dobson	J. L. Ironmonger	M. G. Planck	G. A. Tistaert
L. M. Baughman	I. Disraeli	C. W. Jones	R. R. Roberts	H. H. Trumpower
K. G. Barnett	E. Ehrenclou	F. W. Krause	G. Ramage	A. C. Vielle
T. D. Blake	P. A. Fallgren	R. B. Lichtenwalter	V. J. Smith	D. W. Vanasen
G. D. Berryhill	H. A. Ford	W. H. Lorenz	A. A. Smith	L. W. Volin
V. M. Blythe	G. F. Garcia	John Menges	A. Sanders	G. W. E. White
G. Brown	A. A. Gonzales	K. J. Miller	W. W. Shay	C. M. Woodward
H. I. Q. Brown	W. J. Gea	L. H. Murdock	V. Somerville	R. A. Warren
S. Bleak	B. A. Garvin	H. L. Mitchell	D. R. Smith	Arlo H. Wells
D. E. Brockett	V. J. Gay	H. McElvain	W. S. Sweningsen	J. E. Waters

University of Maryland, Dental Department.

At the annual commencement exercises of the Dental Department of the University of Maryland, held in Baltimore, Md., 1918, the degree of Doctor of Dental Surgery was conferred on the following graduates:

John E. Abbott
Pedro Badillo, Jr.
Jos. W. Baker, Jr.
Harold F. Bradshaw
George K. Brazill
Clarke S. Bressler
Miles S. Buck
Geoffrey C. Buehrer
Cecil K. Charbonneau
Romeo P. Charest
Clarence Cohen
Harvard E. Colwell
Clarence J. Conway
Harold R. Cooper
Ella B. Cox
Santiago F. Diaz
Crown O. Diehl
Aaron Domnitz
Max B. Dunn
James F. Egan
Wilmer H. Fitch, Jr.
Ralph Fletcher
Oren H. Gaver
Wm. A. Gray
David Greenberg
Abraham Grossman
Warder A. Hall
Leonard E. Hamel
Louis V. Hayes
Arthur V. Hazlitt
James F. Hines
Frank A. Hodgdon
Isaac H. Horn
Walter E. Hutson
Henry Joachim
Leopold H. Karow
George A. Kirby
Edward L. Knoebel
George S. Koshi
Thomas G. Leggo
Brownie L. Lewis
Abe Livingston
Clement P. Luongo
Michael J. McAndrew
Frederick J. McCanless
Carlos F. Maristany
Chas. B. Martin
Adam Mielcarek
Douglas M. Milne
Norma R. Mitchell
James B. Montgomery
John A. Mooney
William T. Moore
Carmen A. Mora
Henry VonMurray
William J. Murray
Ignatius Neulander
Ernest S. Noel
Edward J. O'Donnell
William H. Parke
Richard C. Parks
Gardner H. Patterson
John R. Pharr
Arthur W. Phinney
Santiago R. Cubano
David A. Rubin
Jesse E. Rutrough
John L. Sherman
Harry Silverberg
Samuel L. Slovin
Charles F. Smith
George Cortland Ston
Abraham Sussman
Charles A. Thomas
John M. Underhill
Robert B. Varden, Jr.
Dan O. Via
Joseph E. Welch
Lloyd B. Wolverton
Lawrence R. Wolverton
Harvey U. Yeater
Max H. Zeisler

University of Michigan, College of Dental Surgery.

The annual commencement exercises of the College of Dental Surgery of the University of Michigan were held in Ann Arbor, Mich., June 27, 1918.

The commencement address was delivered by Wm. L. Bryan, LL.D., president of Indiana University.

The degree of Doctor of Dental Surgery was conferred on the following graduates:

Victor Adams, 3d
LaVerne H. Andrews
Ernest N. Bach
Reame L. Bailey
Irving E. Baker
Roberto C. Barbosa
Heman E. Barlow
Glenn R. Barnes
Frank J. Bauman
Robert V. Bird
George K. Bolender
Albert L. Brock
James G. Brown
John F. Bulmer
Felix S. Burkholder
William F. Chadwick
Frank O. Clifford
Albert R. Collins
Harold C. Cramer
Rex P. Cranson
Harte E. Deming
Walter W. Denig
John E. Dodge
George D. Drudge
Albertus W. Eksteen
Frederick H. Essig
Hiram B. Fassett, Jr.
Emerald J. Garlock
Garland G. Gee
Kenneth R. Gibson
William J. Goude
John H. Haley
Gerald G. Hall
Signe M. Hamalainen
Bidwell C. Hansen
Frederick J. Henry
Richard U. Hirwas
Paul J. Holt
Alan D. Honey
Edgar A. Honey
Bertram V. Ingle
Louis M. James, Jr.
Harold J. Jones
Francis H. Kelly
Eugene G. Klaver
Harry S. Lamlein
Dhilve D. Langlois
Herman H. Lichtig
John L. Lundberg
Albert MacDonald
Robert D. MacDonald
Hendrik J. Marais
Karol J. Marcinkiewicz
Clement P. Martin
William J. B. Mason
Abie R. Melcher
Clarence G. Miller
Donald L. Mitchell
Elwood W. Morris
John M. O'Leary
Carl O. Osborn
Moe S. Perlis
George M. Peterson
Verne E. Peterson
Lowrie J. Porter
Carlisle B. Rathburn
Clarence A. Rebentisch
Albert G. Riddering
Terry J. Roberts
Robert A. Ross
Lennox J. Schmidt
Albert A. Seele
George F. Sheffield
Matthew O. Sivula
Hilda M. Smith
Henry Starikoff
Clayton E. Stevens
Frank W. Stockton
Oliver M. Strong
John W. Sweet
Earl H. Teetzel
Gerhard E. Thrun
Frederick H. Tinsman
Peter C. Treleaven
Clyde E. Tuttle
Millard R. Twiss
John A. VandenBosch
Frederick A. VanRiper
Francis B. Vedder
Perry VanWhitaker
Max M. Williams
Newlands A. Williams
William H. E. Williams

Marquette University, School of Dentistry.

At the annual commencement exercises of the School of Dentistry of Marquette University, held in Milwaukee, Wis., the degree of Doctor of Dental Surgery was conferred on the following graduates:

V. G. Bancroft
Chas. J. Bauman
Howard Bibby
Glenn A. Brown
Rexford L. Bullis
Prosper H. Burbey
Earle D. Calkins
Ernest Charlebois
Irving A. Clark
Joe Cohn
Clarence Collins
Hayes F. Cunningham
Albert V. Delmore
Raymond Dempsey
Sylvester A. Donovan
Gregory J. Downey
Earl Doyle
Ralph W. Draper
Eugene Dwyer
John Fay
E. V. Fitzgerald
Robert L. Fitzgerald
Robt. Fladeland
Walter D. Gearen
Alexis L. Goral
Emerson R. Grebel
V. E. Habermann
Henry Hahn
Ray W. Hamm
V. W. Helmbrecht
John C. Holland
Rudolph Horshak
Byron Ising
Thos. W. Jacobson
Harry L. Jenkinson
Alphonse A. Kaminski
Raymond P. Kirsch
W. H. Kleinschmidt
T. W. Klemish
Rudolph Kluetz
Fred J. Kostlevy
Conrad Kolb
Francis C. Krumholz
Harold M. Landing
Geo. Lane
Emil W. Larson
R. H. Lehman
W. A. McGill
Edward Mahoney
John L. Maney
E. J. Marek
Harry J. Marshall
Carl Marth
Albert Martin
Robt. A. Mason
Carl Maurer
Frank Meagher
E. A. Miller
Paul Mueller
Bernard Munson
R. E. Mutchler
Dwight G. Nelson
Matt. A. Nemetz
Fred E. Norman
Wm. E. Ogilvie
Ben. J. Ouellette
Wm. R. Owen
Clyde H. L. Park
Leo L. Peterson
Leo G. Pett
Arthur C. Plautz
Bennett Quackenbush
C. A. Reinnoldt
Leo J. Roth
Paul Satterlund
Robt. Schade
A. W. Schief
Theo. Schulte
P. W. Segerson
Raphael Shea
C. H. Springborn
E. Steinhaus
John Stoever
Glenn Taylor
Bernard Thompson
J. Thornquist
C. Van Alstine
P. A. Van Roy
G. A. Wagner
L. E. Washburn
Edgar Watrous
S. H. Weideman
F. M. Wheeler
Alex. R. Wiener
R. C. Wittke
Walter A. Wornson

University of Buffalo, College of Dentistry.

At the annual commencement exercises of the College of Dentistry of the University of Buffalo, the degree of Doctor of Dental Surgery was conferred on the following graduates:

Nelson J. Abare
Clarence J. Argus
Delos S. Aumock
Lyman D. Bassett
Robert R. Baxter
Willard S. Bell
Harry Berman
John H. Boorman
William H. Bouchard
Willard S. Boyd
Percival G. Bradley
Benjamin R. Breu
Edson R. Brewer
Foster K. Brown
Raymond E. Buck
Warren H. Buell
William J. Burns
Joseph L. Carr
Clifford H. Case
Vincent Castle
Robert G. Clark
Daniel J. Coakley
Albert E. Connolly
Simon E. Cooper
Edmund B. Coughlin
Frank A. Dillon
John F. Donovan, Jr.
Joseph E. Drexelius
Wallace L. Eastman
Ralph W. Eaton
Austin W. Failey
James L. Fitch
Wilfred E. Follett
Morris M. Friendly
Clifford L. Gibbin
Russell W. Groh
Philip Goldberg
Irving Goldstein
John H. Grace
William M. Hayes
Claude A. Hodder
Alonzo D. Hunter
David B. Jacobs
Gordon B. Jacobs
Allen C. Johnson
Vernon H. Jordan
Bernard Katzenstein
William Keiran
John I. Kerns
Ephraim Klein
Walter B. Knight
Harry B. Levin
Louis J. Lodico
James H. McGill
Robert C. McKay
Thomas F. McManus
Richard J. McRedmond
Willibrord F. Mahaney
Melvin M. Marks
Sidney S. M. Marks
Joseph W. Martin
Sophia L. Mazurowska
Guernsey H. Merchant
LeRoy W. Michael
Harry W. Miers
Edward R. Milcher
Lawrence G. Morah
Frank Neuman
Leonard J. O'Brien
Francis S. Owens
Archie V. Parlato
Guy W. Patterson
Earle C. Payne
Griffith G. Pritchard
Richard J. Reilly
Clayton L. Ripley
Henry I. Rothschild
Leonard A. Sapienza
Clarence A. Schlieder
Paul Shapiro
Louis Siegel
Russell O. L. Smith
Albert B. Spitzer
William D. Sprague
Max M. Starsky
Joseph W. Stein
Earl M. Stillman
Edwin J. Stowell
William J. Straney
Alfred P. S. Sweet
Michael Swiados
William R. Trolley
Nelson J. Twist
Henry L. Vortrefflich
Sheridan C. Waite
Fenton B. Weaver, Jr.
Edward C. Weinz
Henry J. Winters
Howard G. Wood

Army and Navy Dental News

Report of Committee on Dentistry.

At the time the United States declared a state of war to exist between this country and Germany, the total number of dental officers was 58—18 captains and 40 first lieutenants—a sufficient number to care for an organization of fifty-odd thousand men. Probably less than 30 of these were stationed in the United States, and they were widely scattered. The law at this time only permitted the commissioning of Dental Reserve Corps officers in the grade of first lieutenant, and there was not a nucleus of a reserve corps to start with, as in the case of the medical service.

In the past year the number of dental officers has increased from 58 in the dental corps of the regular army to 209, in the National Guard to 259, and in the Dental Reserve Corps to 5196—or a sufficient number to supply the quota permitted by law for an army of 5,664,000 men. These officers, as a result of the dental law enacted on October 6, 1917, are distributed in the same grades and percentages within the grades as are allowed for officers of the medical corps of the regular army and National Guard and of the Medical Reserve Corps. The commission of first lieutenant was tendered to 5467 dentists, and 95.1 per cent. accepted—all but 271.

In the rapid development of the dental service, all credit must be given the patriotism of the members of the dental profession, the various preliminary dental examining boards, dental faculties, dental manufacturers, and officers and members of the Preparedness League of American Dentists, an organization which a year ago had a membership of 5000, but today has about 15,000 members, who have paid the membership fee and declared their willingness to render gratuitous service at least one hour a day, when called upon, to assist in making dentally fit the selected man, after he had been certified to by his local board, and previous to his induction into military service.

The official record shows that 166,000 gratuitous dental operations have been performed by the members of this organization. This organization has been largely responsible for the three dental motor-car ambulances that have been presented to the Surgeon-general of the army. More efficient dental service is expected to result from the fact that dental inspectors are now regularly visiting the cantonments and camps.

The committee has co-operated closely with the deans of dental schools. At a conference held May 12, 1917, attended by deans of thirty-six dental colleges and twenty representatives of state examining boards, with this committee, many details designed to coordinate dental activities were agreed upon. At another conference, July 18th, fifty deans discussed with this committee the enlistment of dental students in the enlisted Medical Reserve Corps and their assignment to the inactive list.

Upon the recommendation of this committee a survey of dental and oral hospital physicians was made. An investigation was initiated as to the relationship of trench-mouth disease and oral and general disease. In co-operation with the dental manufacturers, dental instruments and supplies were standardized.

Military instruction was included in the curricula of dental colleges, and special training of applicants for enrollment in the Dental Reserve Corps initiated. Improved courses in the army and navy medical schools for army and navy dental surgeons were recommended.

A school of instruction for dental officers started March 15, 1918, at Camp Greenleaf, Fort Oglethorpe, Ga., with Lieut.-col. Snapp, Dental Corps, as senior instructor. Eighty-five dental officers and enlisted *personnel* are assigned each month to take the two months' course. The first month is given over to 180 hours of general military instruction and training, and the second to 70 hours' special military training, and 110 hours devoted to professional subjects that have a definite relation to general practice of dentistry as it should be conducted in the army.

The United States is the only country giving such extensive training in military and professional subjects to dentists, and this nation has a greater number of dental officers

subject to military call than all other nations combined represented by the term "the Allies." —*Surgery, Gynecology, and Obstetrics.*

Army Dental Corps.

No more appointments as officers are being made in the army dental reserve corps, excepting among those candidates who were examined prior to September 18, 1917, and who failed to meet the physical requirements and now are being given another opportunity by reason of the modification of the requirements since that time. The dental school at Camp Greenleaf, Fort Oglethorpe, Ga., is busily engaged in preparing both officers and enlisted men for their professional duties with the army, particularly overseas. The course lasts two months, the first month being devoted to military training, the second month to professional instruction, special attention being given to cases emanating from the expeditionary force and from the forces of our allies. Eighty student-officers are selected each month for this instruction, the selections being made mostly from those already in the service, both in the regular dental corps and in the dental reserve corps. Enlisted men are sent to the school for a similar period of training, their course also consisting of a month each of military training and of professional subjects. Enlisted men are selected from dental students, and the instruction they receive at the school is for the purpose of fitting them as dental assistants.

The convention of the National Dental Association, which was held last week at Chicago, was attended by several delegates from both the army and navy dental corps. The association conferred honorary membership upon Surgeon-general Braisted, of the navy, and Surgeon-general Gorgas and General Noble, of the army.

It is expected that examinations will be held next January to fill places in the dental corps of the regular army. There will be in the neighborhood of 70 vacancies.

—*Army and Navy Register.*

Death of Dental Surgeon Osborne.

The Navy department has been advised of the death of Dental Surgeon Weeden Edward Osborne, U. S. Navy, who was killed in action in France, June 6th, while attached to the marines serving with the American Expeditionary Force.

The distinguished service cross was posthumously awarded Dental Surgeon Osborne by the commander-in-chief of the Expeditionary Force, with the following notation in official orders: "Dental Surgeon Weeden D. Osborne, U.S.N., during the advance on Bouresches, France, on Friday, April 6, 1918, at great risk of his life, performed heroic deeds in aiding the wounded. He was struck by a shell while carrying an officer to a place of safety."

Dr. Osborne, who had been with the marines at the front only a few days when the action at Bouresches took place, went into the zone of fire time and again to rescue wounded. He went to the aid of a wounded officer, and had succeeded in carrying him almost out of the range of fire when a shell struck, killing both Osborne and the officer. In reporting his death, his commanding officer wrote: "Having joined this regiment but a few days before, and new to the service, he displayed heroism worthy of its best traditions."

Dental Surgeon Osborne was born in Chicago, November 13, 1892. On May 8, 1917, he was appointed a dental surgeon in the navy, and served at the navy yard, Boston, from June 5, 1917, to December 13, 1917, when he was detached and assigned to duty on the Alabama. On March 30, 1918, he was ordered to report to the commanding officer of a regiment of marines with the American Expeditionary Force in France, and was serving with this regiment at the time of his death. Next of kin, Elizabeth Osborne, sister, Chicago, Ill.—*Army and Navy Register.*

Dentists in the British Army.

Mr. Pennefather asked the Under-secretary for War how many qualified dental surgeons now held commissioned rank in the army; how many had been commissioned since March 1, 1918; how many of these had been commissioned from the ranks since that date; and how many were now remaining in the ranks. Mr. MacPherson: The number of qualified dental surgeons who hold commissions in the army is 640. Of these 92 have received their commissions since March 1st last, including 26 from the ranks. As regards the last part of the question, inquiry is being made. Mr. A. F. Whyte: Does the right honorable gentleman say that there are only 640 dentists for the British army? Mr. MacPherson: Yes. Mr. Whyte: Scandalous!—*Lancet.*

Promotions.

Dental Reserve Corps.

THE following appointment (promotion) is announced (April 24th):

To be MAJOR: 1st Lieut. Albert W. Marshall.

Announced July 27th:

To be CAPTAINS: 1st Lieuts. Laurence E. Aldrich, John D. Albin, Clarence S. DeLong, Robert L. Donaldson, Henry S. Davis, Howard W. Geiger, Frank F. Happy, Wm. H. Hatcher, Chauncey H. Jones, Ralph O. Leonard, Edwin J. Nestler, Wm. T. Roberts, Howard E. Summers, Herbert J. Schiewetz, Roy G. Strickler, Harold J. Thorne, George P. Taylor, Oscar W. Thompson, Peter J. Wumkes, and Joseph E. Wilson.

Announced August 17th:

To be MAJORS: 1st Lieuts. Wm. H. Potter, Charles S. Jack, John B. Wagoner, and Rumsey F. Rowdybush.

To be CAPTAINS: 1st Lieuts. Allen N. Kearby, Wm. J. Eggleton, Chalmers L. Crist, David S. Smith, Lewis A. Platts, Frederick H. Saunders, Edward H. Raymond, Jr., Bertram S. Rothwell, Wm. S. Sykes, Frederick J. Brockman, James A. Brown, Edwin Shoemaker, Chas. W. Freeman, Wm. W. Irving, John C. Vander Voort, Wm. T. Shannon, Earl C. Barkley, B. Lucien Brun, Beon R. East, Lloyd Y. Beers, Harry R. Smith, Francis J. Bailey, Earl P. Jones, Alfonso F. Wilbur, Stevens W. Brown, Francis J. Rogers, LeRoy Holland, Harold F. Anderson, Alfred E. Bernstein, Herbert R. Boyd, Mendsay M. Dexter, Doyle B. Morris, and Lynwood Evans.

Assignments.

Army Dental Corps.

Week ending August 3d.

1st Lieut. Wm. B. Stewart from duty at aviation camp, Camp Greene, N. C., to Fairfield, Ohio, aviation school.

Week ending August 17th.

Lieut.-col. Raymond E. Ingalls to Palo Alto, Cal., Camp Fremont, for duty as camp dental surgeon.

1st Lieuts. Neal A. Harper and Edward C. Alley from duty in Eastern department to Fort Oglethorpe, Ga., for instruction.

Dental Reserve Corps.

Week ending August 3d.

Maj. Leonard G. Mitchell to St. Elizabeth's Hospital, Washington, for duty.

Week ending August 17th.

Maj. Crittenden Van Wyck to Fort Oglethorpe, Ga., for instruction.

Preparedness League of American Dentists.

ORGANIZED UNDER THE AUSPICES OF THE N. D. A.

THE DENTAL COMMITTEE OF THE GENERAL MEDICAL BOARD, WHICH IS THE AGENCY FOR THE MEDICAL AND DENTAL PREPAREDNESS IN THIS WAR EMERGENCY, HAS MADE IT POSSIBLE FOR EVERY DENTIST IN THE UNITED STATES TO ASSIST IN THE WORK, UNDER THE SUPERVISION OF THE PREPAREDNESS LEAGUE OF AMERICAN DENTISTS. HEADQUARTERS AT 50 EAST 42D ST., NEW YORK, N. Y.

Preparedness League Notes and News.

COMMUNICATION FROM PRESIDENT BEACH.

FREE DENTAL SERVICE.

There are a few points about free dental service that should be emphasized at this time.

1. The League requests its members to give each drafted man ONE HOUR of free dental service. This should be given without question as to ability to pay.

When the hour has been completed, the dentist is at liberty to inquire as to the ability of the registrant to pay a fee to have the work completed, should additional service be required. Should he prove himself worthy of further free service, the dentist continues such service in the name of the League.

Such service only is reported to the League.

2. All dental work for which a fee is received from the drafted man is *not* Preparedness League work.

Such service must *not* be reported to the League.

FREE is a word that cannot be qualified and admits of no variation. The charge of a single farthing nullifies the spirit of the League through which free dental service is given.

We have a million of our boys in France. How many of them are suffering from dental ills because you and I did not give them free dental service? Thousands are suffering today because you and I did not do our full duty by them. It is a serious matter, and let us resolve to throw our best efforts into this great work which we alone can do.

Let us fight the enemy with our own weapons—those with which we are most familiar. As dentists, each one of us can do more to help win the war with the excavator, the engine and the forceps than we could by shouldering a gun and taking a place in the first line trenches.

Each one of us can do this in his own office by giving free dental service to the drafted man. Give it freely and without restraint as one of the great privileges of an American citizen, and let us all be thankful that we are able to do this through the heritage of the greatest birthright given by any nation.

President Wilson has shown us our duty when he said, "An army can win a battle, but it takes a nation to win a war."

I commend to the attention of every member of the League the following letter [viz, Lieut.-col. J. S. Easby-Smith's, to President Beach, as published in the DENTAL COSMOS for August, at page 753], which concisely covers the situation and may be considered as stating the rule to follow. It is most essential that we conform in every particular to the ruling of the War department.

J. W. BEACH.

THE treasurer has from time to time received requests from League workers in various parts of the country, for from fifty to five hundred buttons to be sent for distribution at state or local meetings. Because of action taken at a meeting of the officers held at League Headquarters in January, President Beach presiding, to the effect that buttons should be sent direct from the treasurer's

office and shall serve as his receipt, the treasurer has had no alternative but to abide by the ruling. It is hoped that his position has been understood by those who made requests and that his letter of explanation met with their approval. It is obvious that if allotments of buttons were sent to many meetings in various sections of the country, the League would be compelled to have an investment in buttons amounting to several thousands of dollars. This the funds will not permit.

There is also another serious objection. The button is supplied gratis to members who have joined since the 1st of January 1918. To those who joined before, it is sold for twenty-five cents, which is approximately cost. Without a complete directory of the 5900 older members it is impossible for those handling the buttons at a meeting to know who is entitled to purchase them; therefore, some men might be wearing the buttons who were really not members of the League. The officers, I am sure, might be glad to consider any feasible suggestion by which it would be possible to have buttons at the various meetings. There was delay in sending the buttons in February, because of disappointment in manufacture, but since that time buttons have been sent out regularly each week. Under the present plan, when the member receives a button it is certain that his name has been registered on the official list.

THE following figures show the amount of work done by the Preparedness League to June 1, 1918:

Men examined	84,518
Worked for; reported by card	63,625
Fillings inserted	180,593
Teeth extracted	67,247
Plates made	630
Crowns made	2.040
Crowns and bridges	165
Bridges	885
Prophylaxis treatments	33,671
Diseased teeth treated	3,165
Miscellaneous operations	48,535
Total operations performed	336,931

The above is taken from tabulated statistics made by Major W. A. Heckard.

THE United States now has more than 1,500,000 men under arms, and up to date we have records of work done by the League of approximately 220,000 operations, but if each had done his part this number would have been doubled. Some individual members have performed as many as 150 operations; others (new members), none at all, as they have not yet had the opportunity. Our organization should perform 1,000,000 operations for the men of the next draft.

It is important to keep before the minds of all members the fact that we should devote our energies almost entirely to men qualified for general military service. These are the men who will do the actual fighting, and who must live in the trenches, and who consequently are more subject to sickness and infection.

R. OTTOLENGUI,
Publicity Committee.

SPECIAL NOTICE.

VACANCIES TO BE FILLED IN THE EXAMINING CORPS OF THE PATENT OFFICE.

DEPARTMENT OF THE INTERIOR

UNITED STATES PATENT OFFICE

WASHINGTON, D. C.

JULY 15, 1918.

TO THE PUBLISHER OF THE DENTAL COSMOS:

Will you kindly call attention through your columns to the need for technically trained persons for the examining corps of the Patent Office. Men or women are desired who have a scientific education, particularly in higher mathematics, chemistry, physics, and French or German, and who are not subject to the draft for military service. Engineering or teaching experience in addition to the above is valued. The entrance salary is $1500.

Examinations for the position of assistant examiner are held frequently by the Civil Service Commission at many points in the United States. Details of the examination, places of holding the same, etc., may be had upon application to the Civil Service Commission, Washington, D. C., or to this office.

Should the necessity therefor arise, temporary appointments of qualified persons may be made pending their taking the Civil Service examination. Application for such appointment should be made to this office.

Very truly yours,

J. S. NEWTON,
Commissioner of Patents.

SOCIETY NOTES AND ANNOUNCEMENTS

NOTICES should reach the Office of the DENTAL COSMOS *not later* than the 11th or 12th of the month preceding that of publication.

Northeastern Dental Association.

THE twenty-fourth annual meeting of the Northeastern Dental Association will be held at the Narragansett Hotel, Providence, R. I., on October 10, 11, and 12, 1918.

ALVIN A. HUNT, *Sec'y*,
Hartford, Conn.

Preparedness League of American Dentists, Cleveland Unit.

ELECTION OF OFFICERS.

AT a meeting of the Cleveland Unit of the Preparedness League of American Dentists the following officers were elected: E. H. Shannon, president; Ira M. Saum, vice-president; J. Gordon Lowe, secretary-treasurer. Executive Council—F. M. Casto, G. E. Bishop, H. C. Kenyon, G. D. Lovett, D. H. Ziegler, and H. R. C. Wilson.

J. GORDON LOWE, *Sec'y-Treasurer*,
719 Rose Bldg., Cleveland, Ohio.

Susquehanna Dental Association of Pennsylvania.

THE fifty-fifth annual meeting of the Susquehanna Dental Association of Pennsylvania will be held at Hotel Casey, Scranton, Pa., October 9, 10, and 11, 1918.

GEO. C. KNOX, *Rec. Sec'y*,
300-301 Dime Bk. Bldg., Scranton, Pa.

Massachusetts Board of Examiners.

A MEETING of the Massachusetts Board of Dental Examiners will be held in Boston, Mass., October 21 to 25, inclusive, 1918, for the examination of candidates for registration. All applications must be in the hands of the secretary on or before October 11th. For further information address

GEORGE H. PAYNE, *Sec'y*,
29 Commonwealth ave., Boston, Mass.

Forsyth Dental Infirmary for Children.

NEW DEPARTMENT—LIBRARY AND MUSEUM.

THE trustees and director of the Forsyth Dental Infirmary for Children have authorized the creation of a new department, to be known as the "Library and Museum." They solicit from the dental profession contributions of books and dental periodicals, particularly those out of print and not readily obtainable by purchase; also specimens of dental abnormalities, casts, or specimens of unusual structures of dental interest, for all of which permanent acknowledgment will be given.

FREDERICK A. KEYES, D.M.D.,
Librarian and Curator of Museum.

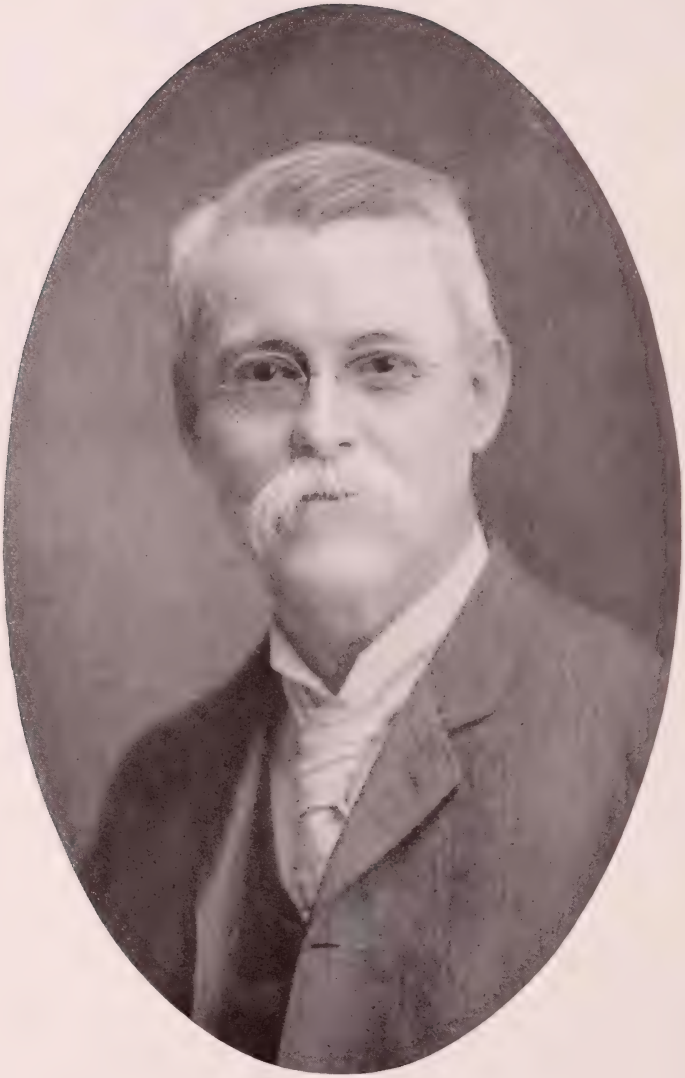
National Mouth Hygiene Association.

DEPARTMENT OF EXTENSION LECTURES.

A COMPLETE lecture set, consisting of full manuscript and thirty-six specially selected and prepared lantern slides covering the subject of Mouth Hygiene, is furnished by this association to members of state dental societies and others who may be considered as qualified to present the subject on the lecture platform.

For rental and sale terms and other particulars address the undersigned.

EDWIN N. KENT,
Director of Extension Lectures,
330 Dartmouth st., Boston, Mass.



DR. GEORGE A. MAXFIELD.

THE

DENTAL COSMOS

VOL. LX. OCTOBER 1918. No. 10

ORIGINAL COMMUNICATIONS

Exercises for the Development of the Muscles of the Face, with a View to Increasing Their Functional Activity.

By ALFRED PAUL ROGERS, D.D.S., Boston, Mass.

[COPYRIGHTED 1918 BY ALFRED PAUL ROGERS.]

(Read before the Eastern Association of the Graduates of the Angle School of Orthodontia, May 6, 1918.)

THE study of the human face is intensely fascinating. The least attentive of us at times enjoys observing and speculating on faces, in a more or less thoughtful way, during those moments when the mind is unconcerned with other interests. Unconsciously, sometimes, we are classifying them as strong or weak, attractive or unattractive; and usually this observation occurs without giving much thought to the factors responsible for the various conditions.

The ordinary observer, if he speculates at all upon the faces which he sees, is apt to hold the mental condition of the subject of his observation responsible in a large degree for the strength, weakness, or peculiarities of development. Many children have been hastily judged to be defective when this judgment has been based upon the undeveloped countenance sometimes typified by the open mouth and the toneless muscles. This may be because the observer has been so engrossed by other things that he has neglected to study the face from a physiological and anatomical standpoint. Possibly he has allowed himself to base his easy judgment upon the assumption that psychologic influences are responsible for some developments to him otherwise unexplainable. His common knowledge of the fundamental functions of the human face has been too limited to permit satisfactory judgment.

As a profession, the anatomical and physiological study of the deeper parts of the face have absorbed our attention almost to the complete exclusion of the more superficial. The alterations that are sometimes effected in facial contour have aroused in us, at times, a high degree of satisfaction, yet many of these changes in outline do not carry with them the guarantee that an establishment of function in general has been attained.

It is a simple matter for us to produce these pleasing outward changes, and it is a temptation to us sometimes to become flattered by such easy conquest. These changes are often brought about by those who employ the most unscientific methods, and the apparent ease with which results of this nature are obtained conduces to a weakness in the system of practice generally. Many of these changes are but temporary, and do not carry with them the establishment of complete function.

The narrowness of our view is by no means surprising, since we started not many years ago as orthodontists—literally speaking, "tooth-straighteners." Although this science has grown broadly until physiological and biological considerations of the parts immediately adjacent to the teeth have been deeply studied, there is yet room for a greater broadening of our conception.

Some of our profession still in their mental conception linger near the narrow horizon furnished by the teeth alone, and make their plans with reference only to those non-functional organs. I am reminded in this connection of a most excellent paper written recently by Dr. A. LeRoy Johnson, setting forth the biological reason why we must consider more thoroughly the surrounding tissues in their relation to the teeth, and clearly showing us which tissues are to be considered functional and which are not to be so regarded.

The present attempt on my part is an endeavor to elucidate some of the difficulties furnished by the abnormal condition and behavior of the soft tissues of the face—stumblingblocks which have annoyed us greatly at times, often hindering us in our conscientious efforts toward attainment of the best results. This paper is given as the result of a perhaps dilatory awakening after some years of thought and experience growing out of an active practice. The observations here noted are possibly not entirely scientific. They may be considered the results of both empiricism and method—not so entirely the result of method as perhaps they would have been had there been time for a more systematic tabulation of observations and facts.

The orthodontist has handicapped himself in the past by trying to gain results solely through his own efforts instead of pointing the way to personal self-improvement by the patient, ignoring the physiological forces which work under the direction of the mind in stimulating functional activity of the various organs which are essential to his complete success. We have not employed sufficiently such a useful instrumentality. We have allowed ourselves to become baffled by the weakness of unused or improperly used forces of the soft tissues of the face.

IMPORTANCE OF PROPER MUSCLE FUNCTION IN THE CORRECTION OF MALOCCLUSION.

My reason, then, for bringing before you the subject of facial muscles and their culture is the very special one that I share, first, the belief that the culture of the muscles of mastication and the so-called muscles of expression is of paramount importance when considered in relation to their influence upon the developing bony structure beneath them. The successful treatment of many cases of malocclusion is dependent upon an understanding of the muscular tissues of the face and the development of their functional activity. Strong, well-controlled muscles are valuable in the maintenance of occlusion when it has been established. Muscle training is the best and most rational means for overcoming various facial muscular habits, such, for instance, as that of mouth-breathing. Another reason why I am glad to read this paper is that opportunity is given me to present to you a method for the culture of these muscles and for the encouragement of their normal functioning. All that I shall say to you has been verified by my personal experience in practice, and I can assure you that seldom has anything given me quite so much satisfaction, and promised so much for the future treatment, as the development of the muscular tissues of the face in conjunction with a certain simplicity

of mechanical construction employed for the stimulation of the other tissues.

In fact, viewing the practice of orthodontia from the standpoint which I now do, exclusion of some of our methods will be found essential, and the employment of more simple mechanical devices substituted in their stead. The old and crude conception of orthodontia which permits the orthodontist to admit that he is a regulator of teeth, and that his chief reliance lies in the expansion arch and ligatures, has no place in the plan of procedure that is designed to fit in with the practice based upon the development of normal functions of all the facial organs. This form of appliance hinders the developing influence of many of these muscles. It is a frequent producer of dangerous and long-enduring muscular habits. It rather discourages the performance of the normal activity of the muscles within the radius of its influence. If you will turn to your textbooks on Orthodontia and study the illustrations of the expansion arch and ligatures you can readily make your comparisons. It will not be long, I believe, before the expansion arch will be used only infrequently. Something like this attitude is bound to become general when deeper study is made into the possibilities of development attending systematic efforts along rational lines of functional development.

Many facial maldevelopments in common with other bodily abnormalities are due to improper and feeble functioning from early childhood. There are many cases offering a definite resistance to the orthodontist in securing desired results. You have seen dozens of children mouth-breathers who have been operated upon by skilled surgeons and orthodontists, and who are still mouth-breathers, with untrained muscles of respiration, unused facial muscles, with weak wills in relation to these organs. These are things we need to think and talk about, in order to become, in the quickest way, of the most use to our patients.

From the orthodontist's standpoint the muscles of expression are much more than the name implies, for they are the muscles which, if not properly developed, are apt to give evidence of lack of facial harmony. They are the muscles which, if not under proper nervous control, are likely to assume various forms and abnormalities in action, resulting in malformation of the fragile osseous structure of the face in young and growing children. My observation teaches me that uncultured muscles are apt to be the ones that assume unhealthy habits. It is certainly true that uncultured muscles lack tone, and in lacking tone they do not respond to normal stimuli with the same degree of activity and precision that is found in those that are under proper control. Moreover, it is well for us to remember that muscles tend to stay in the position in which they do their greatest and hardest work. I have seen distorted parts become permanently so, by the habitual tension of one small muscle.

If you will turn again to the textbooks on Anatomy and Physiology you will find some interesting chapters on myology and physiology of muscular tissue, and you will note with greater interest and a broader understanding the marvelous functional system here developed, and capable of serving us as an ally instead of an enemy.

PHYSIOLOGY OF MUSCULAR TISSUE.

Before entering into the consideration of the practical application of the views which I am to present to you it is logical for us to review briefly some physiological facts. We learn that the movements of various parts and organs of the body are brought about by a special histological structure, and possess the special function of contracting in length under the influence of a proper stimulus. Our study is based solely upon the small group of skeletal muscles whose structural arrangement and mechanical action are based upon a common plan, and are to be understood as being chiefly masticatory and facial. The cells of which these skeletal muscles are composed are long, narrow, and striated. They differ somewhat from the structure of other

muscles of the body, and in differing in structure they differ in function. The principal difference is that the striated muscle is under direct control of the central nervous system.

A typical skeletal muscle consists of a fleshy mass enveloped in a membranous aponeurosis or fascia, and provided at its end attachments with tendinous connections to either the bone or cartilage, or, as in the case of the myoides, to fascia and skin. Each one of these muscles is made up of a number of fasciculi, arranged in such a way as to give form corresponding to the function of that particular muscle.

These bundles of small fibers are held together by a delicate connective tissue called the perimysium, continuous with the surrounding fascia which incloses the muscles. Each smaller bundle is composed of a number of narrow elongated muscle cells or fibers held together by a still more delicate connective tissue *i.e.* the perimysium internum. This delicate membrane is in turn connected with the smaller cells of the muscle, and also with the external perimysium. Thus it will be seen that muscles are highly organized even when considered in connection with muscular tissue alone, and that they are essentially organized as the agents of motor activity when nervous, vascular, and lymphatic systems are considered.

It is interesting for our purpose to note how generously each muscle is supplied with nerve tissue, which, after entering the substance of the muscle, separates into smaller and smaller branches until ultimately it terminates in small fibers in each muscle cell.

Now, we have seen that the muscles may be regarded as organs endowed with particular properties; that being supplied with nerve tissue they are designed for definite movement in response to some stimulus, and that there is every reason to believe that the purpose of nature was to effect co-ordination of action through the elaborate though delicate nerve supply.

Muscles in their physiological condition require for their maintenance and their activity a very large amount of nutritive material, since they are in a measure heat-producing organs. There is a certain amount of breaking down and rebuilding, and thus the lymphatic system is found as intricate and complete as the other systems. The lymph capillaries relate to the muscle fibers as does the nerve tissue, and give off short transverse branches which immediately break off in the capillary network surrounding the muscle fibers. It will be seen that they are admirably constructed for the work of repair and waste. The nutritive material passes through the capillary wall into the lymph space through the sarcolemma where it comes into the living tissue. The waste products pass first into the lymph, then into the blood stream, whence they are carried away by the eliminating organs.

The physiologist tells us that the properties of the muscles are their irritability, contractility, elasticity, and tonicity. It will not be necessary for us to study these properties, for we know their significance in a general way, but it will be interesting for us to make reference to the mode of muscle stimulation in order to complete our conception of what muscles are, what they are for, and how they can best be kept in normal condition.

The stimuli are furnished by action of the nerve impulses transmitted by nerves from the central system to the muscles. Each muscle impulse is a normal physiologic stimulus, and is under direct control of the will.

Muscle culture, then, by its very nature is also mental culture, because it calls forth repeated efforts of the will, and the exercise of the function of the brain and the function of the muscle is, I believe, mutually beneficial.

Prof. F. Stanley Hall, an investigator of unusual merit, says: "The muscles are in a most intimate and peculiar sense the organs of the will. They have built all the roads, cities, and machines in the world, written all the books, spoken all the words, and in fact have done everything that man has accomplished with matter. If they are undeveloped, or

grow relaxed and flabby, the dreadful chasm between good intentions and their execution is liable to appear and widen. Character might, in a sense, be defined as a plexus of motor habits." Is not this testimony of a man whose life has been spent in investigation full of significance for us?

Doubtless any one of you can recall to mind certain patients whose facial muscles are so flabby and inert that it is difficult to define one muscle from another. In my investigation of this subject I have discovered many faces in which pronounced malocclusion exists where there is little control of various groups of muscles. I have found many patients who are unable upon command to throw any considerable effort into the masseter muscles. Others I have found who are unable to control the pterygoid muscles upon the first few attempts, but after repeated efforts are able to operate, at will, both of these groups. It has further been found that groups of muscles which have not been subjugated to the control of the central nervous powers as they should, fail to give evidence of their complete development. In some instances they even cease to respond to mental stimuli save after repeated and prolonged effort.

The motor activities with which we are most concerned should be performed with exactness and precision of both mind and muscle. The hands of a pianist or violinist show excellent examples of a high degree of muscle culture. Many have an erroneous idea that the muscles become excessively large under continuous stimulation, but each muscle or muscle group has imposed upon it its limitation in strength and size. It is, therefore, not to be supposed that all men can develop muscles to compare with those of a Samson, but it is true that all muscles under a sufficient degree of normal stimulation, providing the health of the individual is sufficient, can be developed into strong and efficient organs.

We can readily understand that the motor efficiency of the parts of the body upon which we are directing our attention depends upon the ability of our patients to gradually attain the faculty of directing mental stimuli in sufficient amounts to effect their development. It is because of the law of mental growth known as repetition that the orthodontist realizes his greatest encouragement regarding this phase of his work—*because the things that are done from choice tend to become spontaneous if often repeated.* Therefore, the ability of the muscles to continue the performance of their full functions after repeated efforts of the will is assured by their educated state. It is well known that the growth and strength of the alveolar tissue depends upon proper function. If we can by this means increase the strength and life of this tissue, the teeth will have a stronger environment and a prolonged usefulness.

In the process of the realization of our ambition along these lines we shall meet with many discouraging and seemingly well-nigh unsurmountable difficulties, but we must be fully mindful that nothing of such importance can develop rapidly and at the same time accurately. Many youths will pass from under our care not much affected by our ministrations and advice, but on the other hand many of them will realize that the development of the functions of the face can be only a blessing to them.

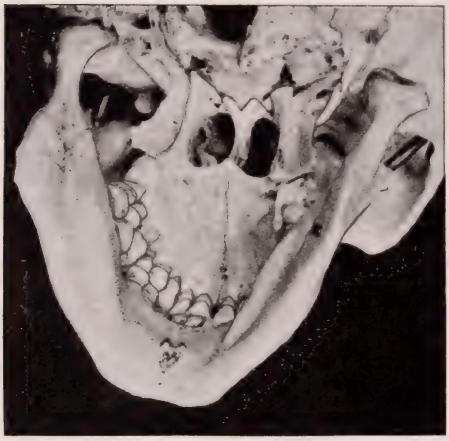
In suggesting and recommending this form of investigation I want to say emphatically that it will be well for us to proceed with caution. I do not know that in this paper it will be possible for me to point out all the dangers, since I may not know them all, but it is possible for me to point out the seriousness of the undertaking and to urge careful consideration and study before attempts are made to develop functional activity of any tissue in which we are interested.

The student of this work must be conversant with physiology. He must be always on the watch against the establishment of harmful habits. He must be careful not to overstimulate long-unused muscles. He must be careful not to expect great results from little effort.

RELATION OF MUSCULAR FUNCTION TO MOUTH-BREATHING.

It is my belief drawn from experience that the great problem of curing or overcoming the habit of mouth-breathing is through the exercise of muscular function. We are all perfectly familiar with cases operated upon by the rhinologist where the removal of the nasal obstruction, adenoids, and tonsils has not been followed by the beneficial results promised. In the case of individuals who have failed to receive the hoped-for results the muscles will be found to lack tone

Fig. 1.



and development. Proper, systematic exercise alone will be found to do more than any other thing to produce harmonious development.

I am reminded of one particularly hopeless case in which I have been fortunate enough to stimulate the patient's interest to the degree that she is following my instructions faithfully, and with excellent results. During a long period of acquaintance I had never once observed this child with her mouth closed, but after a few months of conscientious effort on the part of mother and child we are delighted to find the vicious habit disappearing, and a fine symmetrical facial contour developing.

Another case of persistent open bite, caused by lack of tone of the facial muscles, particularly the orbicularis oris, where mechanical retention failed to give complete satisfaction, has now remained satisfactorily closed after the muscles of the mouth were developed sufficiently to act as a balance to the forces behind.

We shall find when we turn to the needs of our patients that our work is confined chiefly to a group of small muscles, and must therefore differ in some degree from the methods that would be used to develop those of the other parts of the body. In general it will be noticed that the muscles of mastication and those of expression have been used only moderately by our patients, and our first lesson must be to learn not to overstimulate them.

It has been my custom in beginning with a new patient to insist that the exercise be done at stated intervals and under the supervision of an older person who has been carefully instructed. More patience is required in some cases than in others. It will soon be learned that the control of motor life in the tissues of the face will in a large measure overcome the so common tendency to bolting their food without proper mastication. In my personal work with patients I deem it one of the essentials first to strengthen the muscles of mastication, in order that whenever occasion requires they may be used more vigorously, thus still further increasing their usefulness in that their capacity for hard work has been greatly increased.

CONSIDERATION OF THE VARIOUS MUSCLE GROUPS.

We are led now to a brief consideration of the muscle groups. Pictures of these from Gray's and Cunningham's Anatomies will be thrown upon the screen. Those which we shall first consider are the ones in which, for logical reasons, we are most interested, namely, the pterygoid, masseter, and temporal muscles. Later we shall refer to the muscles of expression, which consist of the levators labii, depressors labii, and zygomaticus muscles. The platysma myoides will be

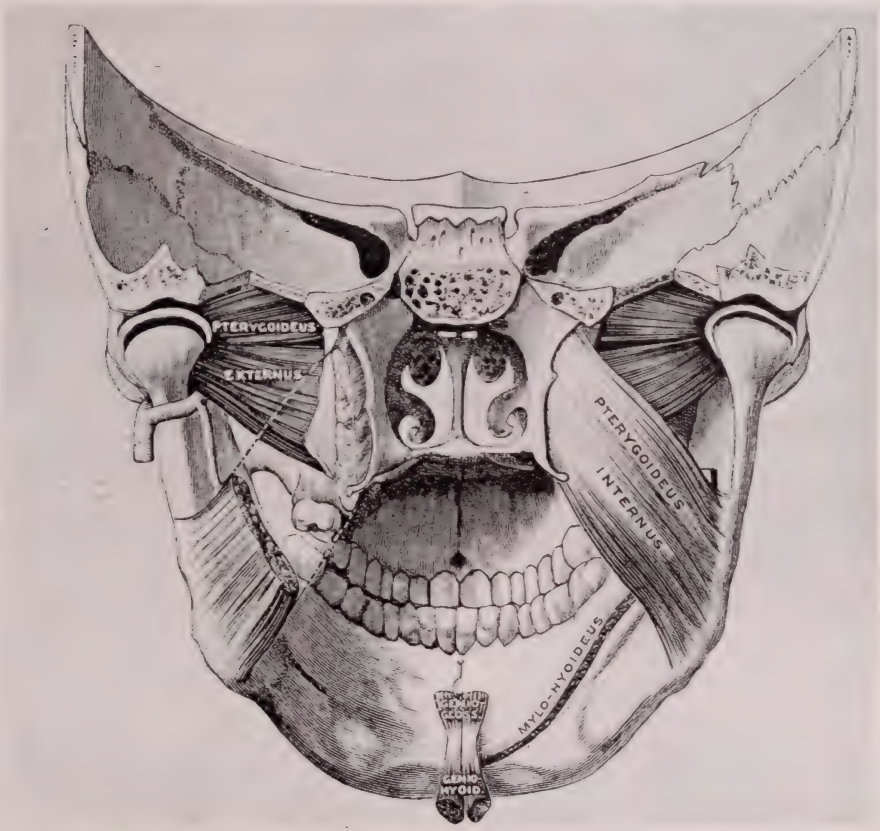
given separate consideration, which it is of considerable importance to our work that they should receive.

MUSCLES OF MASTICATION.

The interesting thing about the muscles of mastication will be found not only in their shape, but in their attachments. The pterygoid muscles are particularly interesting to us from this standpoint, as they will be seen to be attached to points of great advantage when their function, the control of the mandible, is considered. In order to gain a true conception of their relations we will make a brief study of the under surface of the human skull.

It is well to notice (see Fig. 1) the relation between the pterygoid fossa and the plates and the head of the condyle between which some of these small fibers are stretched; also the relation between the external plates and the inner angle of the ramus, where other fibers are stretched. It will be readily recognized that if from early childhood the activity of these muscles has been hampered on account of distal position of the mandible, one of the first duties of the orthodontist, in undertaking treatment of class II cases, is to direct sufficient stimulation to these muscles to accustom them to the altered position which they will assume when the mandible occupies its normal position. It may be well at this point for me to emphasize the importance of the early exercise of these muscles in

Fig. 2.

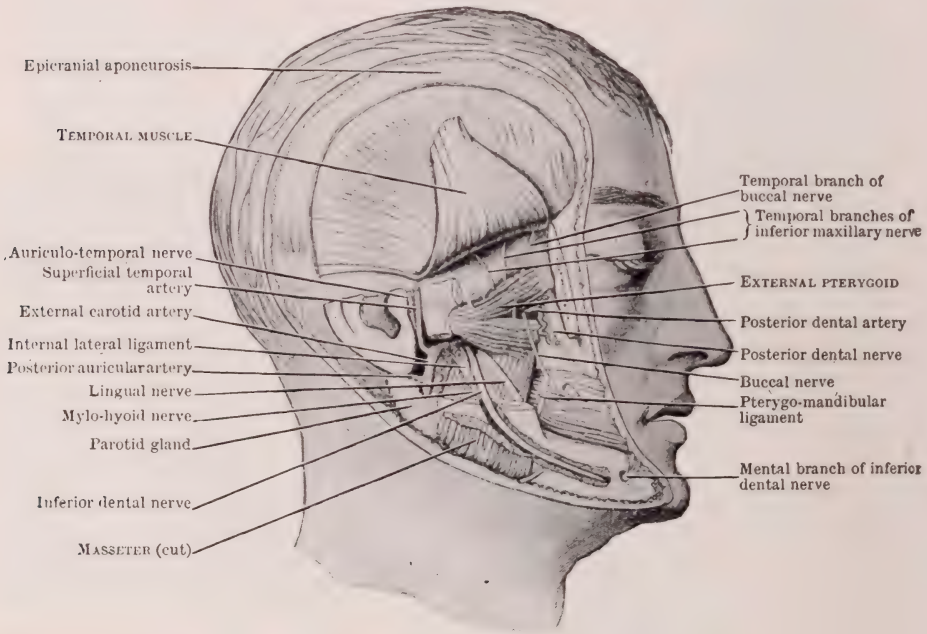


cases where it is required. This is true even where intermaxillary elastics are proposed, or where inclined planes upon the anterior teeth are contemplated. Particularly is this necessary when we contemplate the changes that take place in the glenoid fossa as the child grows to maturity. (Fig. 2.)

You have all experienced, in treating younger cases, the voluntary shifting of the mandible upon the removal of the interference frequently caused by an abnormal narrow upper arch, or perhaps the interference of upper lateral incisors in lingual position. This voluntary change does not take place so readily in older children for the reason that the glenoid fossa has become of such shape as to discourage the pterygoid muscles in overcoming the handicap. I am also reminded that frequently we see cases under treatment where two or three elastics are attached to teeth on each side of the mouth in order to correct a distal occlusion. This practice brings tremendous strain, through the apparatus, on the molars and incisors, and according to my experience is not good treatment.

It seems to me that it is much safer when possible to train these muscles through exercise so that the proper position of the mandible is more readily taken when opportunity is given to it. It not only relieves strain upon the teeth, but avoids many other complications.

Fig. 3.



It is not to be supposed that I advocate the entire abandonment of intermaxillary elastics during the present state of our experience. These still remain valuable adjuncts, and it will be a long time, I think, before we shall entirely discard them. Their use, however, should be carefully studied and the application made as light as possible.

The exercise of the pterygoid muscles previous to the application of inclined planes on the anterior teeth I have found of great service, as the mandible may be readily trained to take the forward position, thus avoiding the strain which is

usually heaped upon the incisors when this form of apparatus is placed upon them without taking this precaution.

Fig. 3 gives a very comprehensive view of the external pterygoid muscles, showing the direction of their fibers and emphasizing the importance of the observations I have just made. It will be seen that these muscles may be regarded as the intermaxillary elastics of nature, and I think you will agree with me that when they are trained to perform their function accurately and well they may be expected to furnish a guarantee of unusual merit for the permanence of our treatment.

Fig. 4.

EXERCISES FOR THE MUSCLES OF MASTICATION.

The exercise for these muscles consists in throwing the mandible forward as shown in Fig. 4. The patient requiring this form of exercise is instructed to throw the mandible forward as far as possible, or until the lower anterior teeth are placed in labial occlusion to the uppers; it is held there for ten seconds and then slightly relaxed. The effort is then repeated as many times as the nature of the case requires. In some cases this will at first be found impossible, but after practice the work becomes easy. This form of exercise is usually prescribed in cases of distal occlusion, and the operator must here be careful in his diagnosis.

Fig. 5.

The liability in overstimulating these muscles in the very young will be obvious

to any of you who have thought at all upon this subject. Very little of this exercise is sufficient in the case of some, while in others it is almost impossible to overdo it. Still further efforts are made for some patients, as shown in Fig. 5. In this instance there is a combination of a posture exercise of unusual merit, and the pterygoid exercise. The patient is directed, after taking the position here

Fig. 6.

Fig. 7.

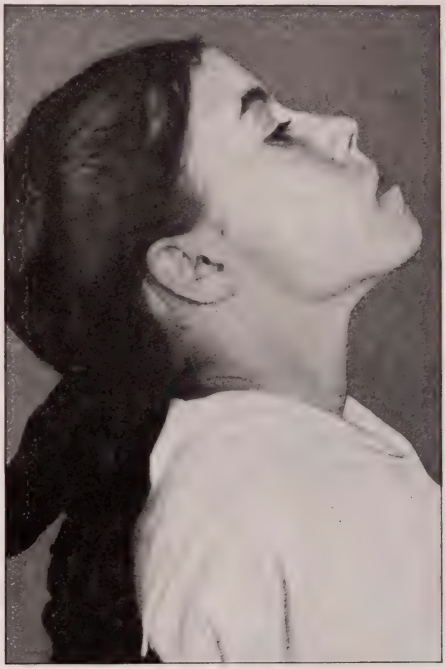
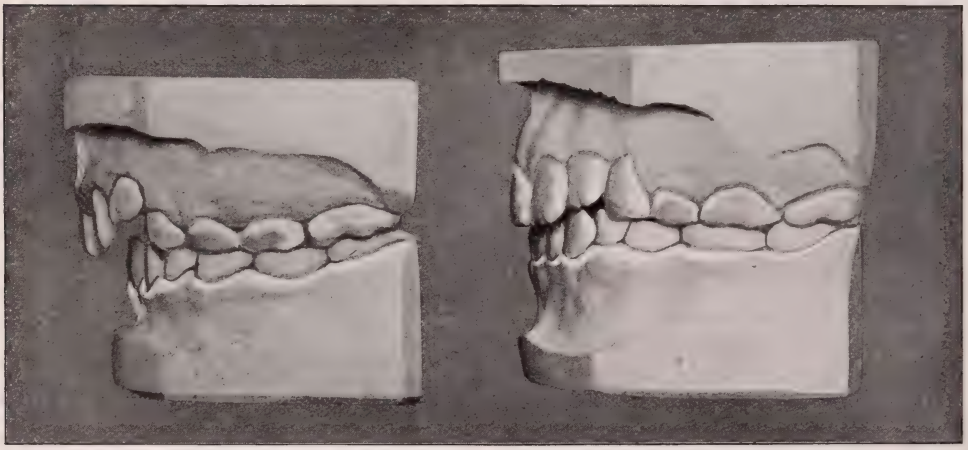


Fig. 8.



illustrated, to stretch the point of the chin upward as far as possible, bringing vigorous strain upon the platysma myoides. Fig. 6 represents a child in great need of the exercise for the pterygoid muscles first, and all the other muscles of the face when occlusion has been established, or during the process of its establishment. Fig. 7 represents the same child undergoing the exercise of the pterygoid muscles.

and relaxing the groups of muscles shown in Fig. 9.

In many cases it will be found that the ability to contract these muscles is very slight indeed, but after a few months' practice the operator is gratified to find greatly increased tone and improved control, as is shown by the ability to contract and relax the muscles. All efforts must be made with great concentration, and must be complete in their

Fig. 9.

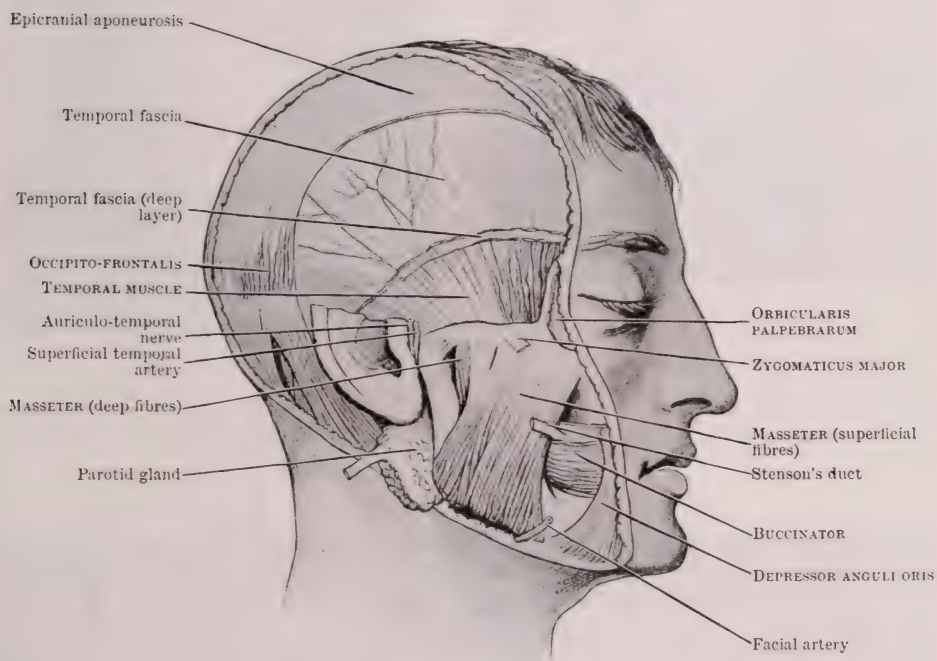


Fig. 8 gives an example of the improved condition after a few months of this exercise in a case of class II. The only apparatus used in this instance was the upper lingual wire, through whose instrumentality the interference of a narrowed arch was removed. After the ability to place the teeth in proper relation had been acquired, the patient had another exercise added—that of the temporal and masseter muscles. This exercise consists of holding the teeth firmly in occlusion and alternately contracting

relaxation and their contraction. The ability to completely relax these muscles between each impulse is important to secure, as muscles exercised in this manner, for physiological reasons, grow stronger much more quickly.

Fig. 10 shows a child in the act of stimulating these groups. The position of the fingers is useful in the beginning, in teaching the child to detect the movements.

Fig. 11 shows a form of exercise for these muscles which may be given when

it is not wise to place the teeth in occlusion, and is used sometimes in anticipation of the exercise just described. It is performed by directing the child to pit

Fig. 10.

the muscles of mastication against those of the hand and arm, alternately contracting and relaxing.

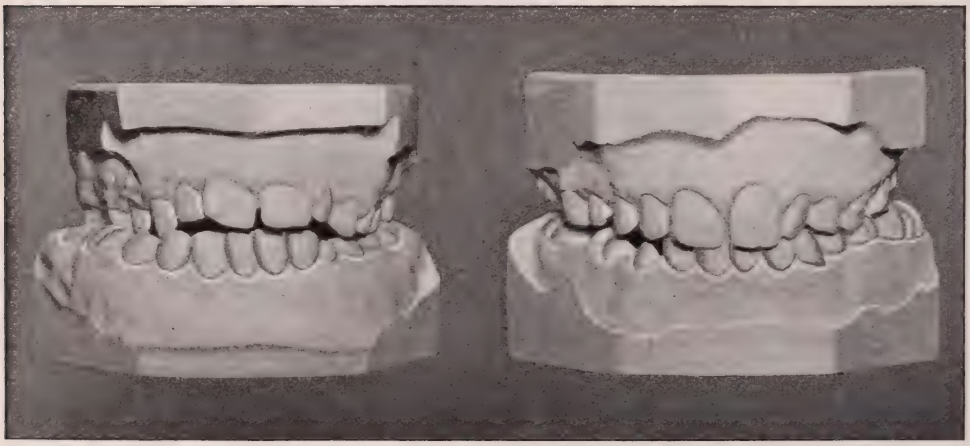
Fig. 12 illustrates a case of a child

lingual wire the upper arch was expanded until the lingual occlusion was

Fig. 11.

disposed of. When this point of development was reached, as will be readily

Fig. 12.



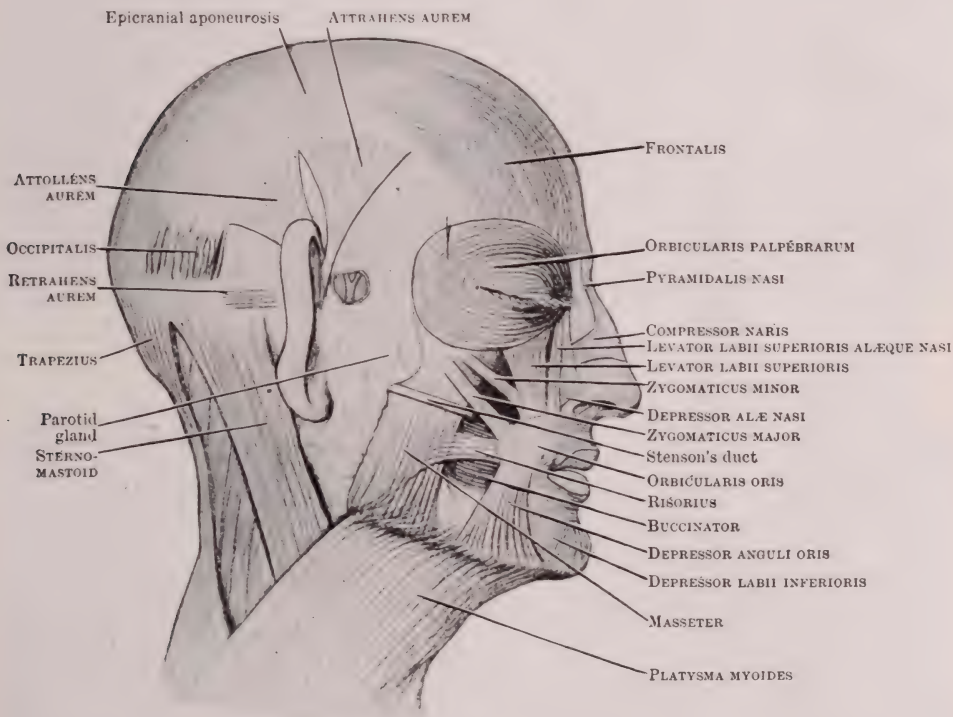
ten years of age, who was suffering from lingual occlusion of the upper bicuspids and molars. By the use of the

understood, the condition of the open bite was much exaggerated, and this is when the patient was instructed in the use of

the exercise of the temporal and masseter muscles.

The figure on the right represents the same case a few months later, showing the correction of the open bite brought about solely by this means. The child's ability to masticate has been wonderfully improved, and it may be said in passing that the high degree of nervous irritability present at the start has largely disappeared, and the child shows a generally improved physical condition.

Fig. 13.



MUSCLES OF EXPRESSION.

Fig. 13 gives a general view of the lesser groups of muscles, but none the less important to the orthodontist. They consist of the levator labii, depressor labii, zygomaticus, orbicularis oris, and platysma myoides. The names of some of these muscles indicate their function and are perfectly well known. If they lack tone, or are not under control of the nervous system, they are the muscles which are most apt to place perplexing problems before the orthodontist.

Most of these muscles are in some way attached to the orbicularis oris, and when we have a general lack of tone in all these muscles there is sure to be lack of balance betweem them and the inner forces, such as the tongue. There are numerous exercises which can be used for stimulation of these groups, but it is not my purpose in this paper to deal particularly with these exercises. It might be well, however, for us to direct our attention to the orbicularis oris. Many of us, no doubt, have had difficulty in retaining the upper incisors in correct position. It is necessary, frequently, to apply retaining apparatus to effect this purpose, but if, in the meantime, this muscle has not become strengthened, in case it originally lacked tone, upon the removal of the re-

taining apparatus the incisors again become protuded. I have several cases in my practice where better results have been obtained in cases of this character

Fig. 14.

without any retaining apparatus at all. One particularly obstinate case yielded to treatment applied for the strengthening of the orbicularis oris muscle.

A valuable exercise I have found for strengthening this muscle consists in pitting the strength of the thumb and first finger, or two first fingers, against the contractile forces of this muscle. Care must be taken in the performance of this exercise not to stretch but rather to contract the muscle around the slightly separated fingers. Thus ensues a contest of strength between the orbicularis oris and the muscles of the fingers. The contracted orbicularis oris can be readily seen during the exercise.

EXERCISE FOR GENERAL FACIAL DEVELOPMENT.

It is frequently found necessary to prescribe a tonic exercise which I have termed the exercise for general facial development. This exercise influences not only the orbicularis oris, but also the buccinator and all the small ribbon muscles which enter into combination with the orbicularis oris. It consists in the use of warm water at a temperature which is bearable to the mucous membrane of the mouth and in which has been dissolved a small portion of bicarbonate of soda. The patient is directed to take a sip of this solution closing the teeth firmly in position, and with great energy forcing the liquid from the lingual cavity into the buccal. The exercise is usually performed five times morning and night. The patient is directed to continue each exercise until the muscles are slightly fatigued. A not unpleasant aching sensation is the indicator of the successful effort. The heated liquid adds a distinct advantage to this exercise as it has a tendency to dilate the bloodvessels, thus producing a more copious supply of nutritive material. At the termination of this exercise the face will be found to glow with warmth.

THE PLATYSMA MYOIDES.

The platysma myoides muscle is one which to my mind is of great importance when considering the correction of faults in the facial muscular development. This muscle has no bony attachments, but is inserted in the fascia and skin of

Fig. 15.

Fig. 16.

the pectoral and deltoid muscles of the chest and upper shoulder at one end, and at its facial extremity is inserted by many fibers into the orbicularis oris and some of the other muscles upon or near their entrance into the orbicularis oris. It will then be seen that, if this muscle is contracted in its length by improper posture of the patient, it has a tendency to stretch the weakened muscles of the face in directions which bring gentle but harmful pressure upon the fragile bony structure of the child's face.

The exercise for this muscle is found in the general posture exercise illustrated in Fig. 5, which consists in having the patient stand with feet together, hips slightly thrown back, then directing the child, with head thrown back, to look straight to the zenith, at the same time drawing in the abdominal wall, and, turning the palms of the hands outward, making a slow and positive stretching motion with the tips of the fingers and the point of the chin.

The child is then directed to relax somewhat, bringing the head and arms to erect position—then repeating the impulse. This exercise is done at first a few times in the morning upon arising, and a few times before retiring, and is increased until the child is able to do it from sixty to one hundred times a day. It is important in this exercise that the child be not allowed to curve the vertebræ so that the back represents much concavity. To avoid this the child is directed, when drawing in the abdominal wall, to tighten at the same time the muscles of the buttocks.

Fig. 17.

Fig. 14 shows a subject much in need of this kind of treatment, and one in which one month of faithful practice has shown most gratifying results.

In Fig. 15 the profile on the left shows a child with slight distal occlusion. It will be noticed that the muscles around the mouth are poorly developed, and evidently not under proper nervous control. The picture on the right shows this same

patient after completion of the treatment and having now very satisfactory muscular development. The figure on the right also shows the improved contour and the more normal nervous control of the muscles of the face. This patient has developed an unusually fine set of masticatory muscles, whereas when the case was started these muscles showed very little development.

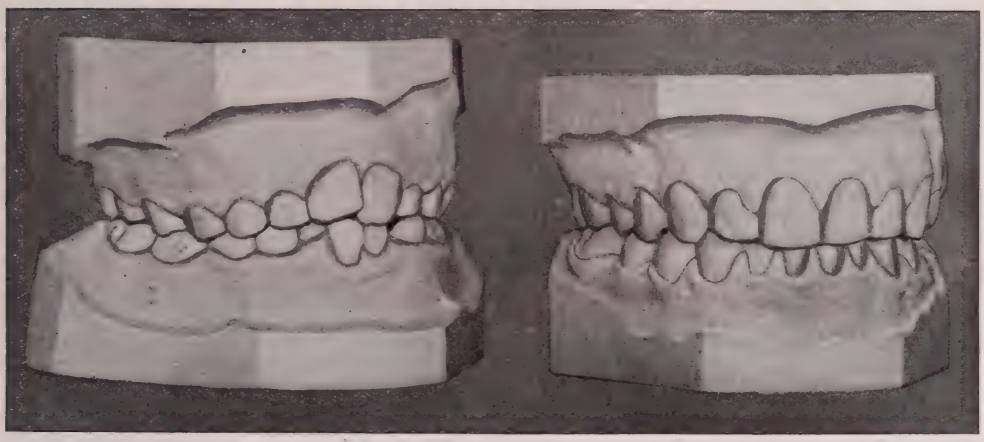
Fig. 16 on the left illustrates the facial contour of a child who was treated for several years by a careful orthodontist. Repeated efforts at retention were of no avail until after I placed the child under carefully prescribed exercises. It will be interesting, I am sure, for you to know that there is no recurrence of the protrusion of the upper and lower incisors, although there has been no mechanical appliance in the mouth for their retention.

I should like to direct your attention to one or two points in this child's face which cannot fail to be of interest. If we look at the region of the masseter muscle, in the picture on the left we notice that it is not well defined—that at the symphysis there is a flattening and puckering of the tissue. It will also be apparent that great lack of tone is evident in the orbicularis oris muscle. In the picture on the right will be seen the well-defined masseter muscles. The nervous contraction of the muscles at the point of the chin has disappeared, and the orbicularis oris has assumed a much more normal appearance. The figure on the right shows the profile a few months later, and after exercise for general development had been practiced. The points to which I would call your attention are again the masseter region, the lower surface of the mandible, the lips, and then the face in general.

It is impossible for me to describe the improvement in the character of the muscular tissue between the periods represented by these two pictures. At present, the feeling of health and strength shows a marked contrast between the feeling of flabbiness and inertia which was so noticeable upon a digital examination when treatment was begun. Fig. 17 shows the front view of this child, and gives us a very good idea of the value of the exercise for the orbicularis oris. It will be noticed that this muscle seems much firmer—we might speak of it as having been condensed, the aperture being considerably smaller.

The case illustrated in Fig. 18 is one which calls for the development of the facial muscles, and represents a class with which we are all dealing daily. This treatment consists of general ex-

Fig. 18.



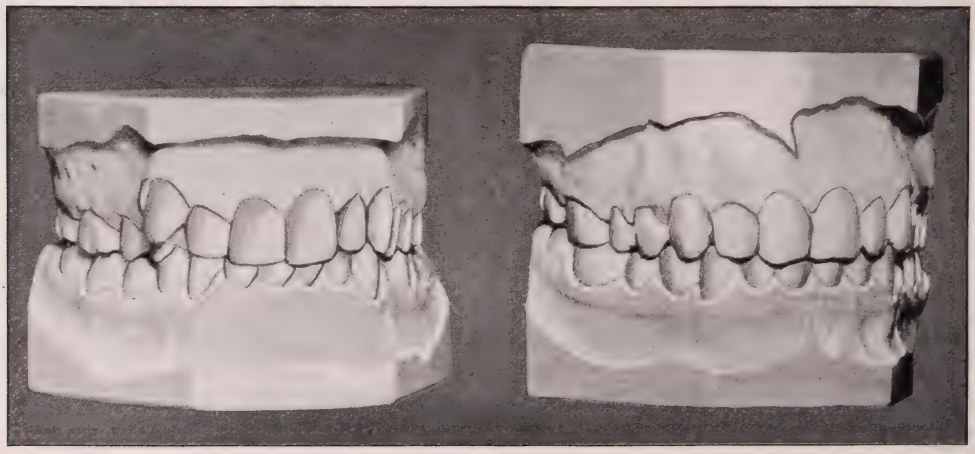
pansion of both arches by means of the junior pin-and-tube appliance on the upper and the lingual wire on the lower. After sufficient expansion was obtained to assure unhampered eruption of the permanent teeth, the child was instructed in the exercise of the masseter and temporal muscles. The upper junior pin-and-tube appliance was then removed. The lower lingual wire alone remains to preserve the development. No attempts whatever were made to correct the individual positions of the upper incisors. They gradually assumed their correct positions under the activity of normal function increased by the muscles of mastication. I offer this case as an example of many others treated in like manner.

Fig. 19.

Fig. 19 illustrates the positions taken by the various forms of appliances—the expansion arch, pin-and-tube appliance, and lingual wire. It will be seen from study of this diagram that the arrows indicate the tendency toward the movement under use of each of the three different systems. The pin-and-tube appliance has its advantage over the expansion arch in that it has compensating force which may be used in the correction of the apical position of the teeth. The lingual wire has great advantage when cases under treatment are to receive the full value of functional exercise. The movements of the teeth, of course, must be very slow, and the activity of the muscles increased as much as possible.

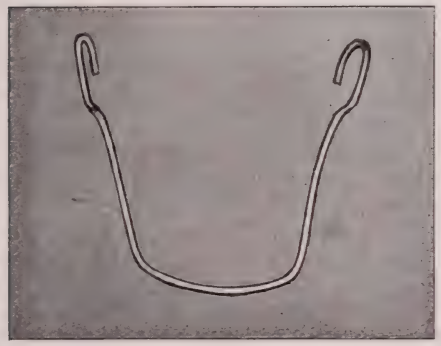
It will be seen that those muscles which come in contact with the labial and buccal surfaces of the teeth are unhampered in their normal influence upon the teeth themselves; and in this manner apical development is secured. The proper use of the lingual wire, supplemented, as suggested before, by activity of the muscles, has in my practice given little evidence of the tendency to tip the teeth. Of course, if the forces that are applied are unbalanced, or in other words, if the force of the lingual wire

Fig. 20.



is so great as to overcome the influence of the muscles, tipping may be expected; but the essential thing is to proceed so slowly that the influence of the muscles

Fig. 21.



is not overcome. These methods are particularly applicable to the young, but may in older cases be used with considerable success. This may be seen in Fig. 20,

Fig. 22.

where the case of a child fourteen years of age was corrected with the use of lingual wires alone, together with a fair degree of exercise.

Fig. 21 illustrates the lingual wire familiar to all of us, but deserving more study and attention by the profession in general. Its simplicity and cleanliness alone should recommend it to more universal study and use.

Fig. 22 shows the anatomical area over which the muscles have their primary influence, and it seems to me a regrettable fact that orthodontists in general find it necessary to fill this space with unyielding and irritating appliances such

Fig. 23.

as so frequently are seen in the employment of expansion arches and ligatures. I should not wish to be understood as suggesting that the usefulness of the expansion arch has entirely disappeared, but I do make the assertion that its usefulness is limited, and is becoming more so.

I am ever reminded in my efforts for my patients that the mission of the orthodontist is not merely that of the "tooth-

straightener," but he must be a developer of the bony tissue which forms the framework for the organs of mastication; that his mission is not to stop when he has placed the teeth in some kind of occlusion; that it is his duty, in order to perform his work well, to strengthen all surrounding tissue that has to do directly or indirectly with the development of the face.

Our guardianship of little children is not complete until we, as orthodontists, gain a broad conception of the scope of our science, and minister to the young under our care until their faces represent not only the ideal from the standpoint of the function of mastication, but also the ideal of perfection in contour and strength which it is their right to enjoy. We cannot do better in reflecting upon our professional work than to keep in mind the physical perfection of primitive man, as illustrated in Fig. 23, Cyrus E. Dallin's "Appeal to the Great Spirit." While we do not turn to him for ideals in many things, yet we cannot escape from him when we seek the ideal of physical strength and endurance.

BIBLIOGRAPHY.

FREDERIC BOGUE NOYES. "Dental Histology and Embryology."

G. STANLEY HALL. "Adolescence."

D. J. CUNNINGHAM. "Textbook of Anatomy."

GRAY'S Anatomy.

520 BEACON ST.

[See also *Discussion*, as reported under "Proceedings of Societies," this issue.]

Careful Technique the Greatest Factor in the Construction of Full Upper and Lower Dentures.

By ALEXANDER H. PATERSON, D.D.S., Baltimore, Md.,

PROFESSOR OF TECHNICS, UNIVERSITY OF MARYLAND, DENTAL DEPARTMENT, BALTIMORE.

(Read before Maryland State Dental Society, Baltimore, June 6, 1918.)

I CLAIM no credit for anything original in this essay. What I am presenting at this time I have gained from reading, from observation in my practice, and through Dr. Hall's instructions for the past three years.

I am often reminded of a statement made by my professor in physics during my early school days, to the effect that the simplest way of doing things is usually the last to be discovered or made use of. So, at last, after all the various investigators in dental prosthesis have practically exhausted all sources in hunting for the truth, Hall brings forth for the profession a system of prosthetic dentistry extremely simple and comprehensive, and yet practical and scientific.

My object this evening is to prove to you that much of the technique given to the profession in past years, and considered absolutely necessary by many of the investigators for the successful construction of full upper and lower dentures, is to a large extent unnecessary.

It is now sixty years or more since Dr. Bonwill through an exhaustive study of several thousand skulls discovered that a line drawn from the center of one condyle to the center of the other measures approximately four inches, and a line drawn from this same center of the condyle on each side to the median line at the point where the inferior central incisors touch at their incisal edges is also approximately four inches. It is

true, however, that these measurements vary, but never more than half an inch. The average is an equilateral triangle, and this is the basis upon which Dr. Bonwill worked and constructed the first anatomical articulator.

All other investigators since Bonwill's time have used his discoveries as a basis for their work, but have centered their thoughts entirely on the movements of the condyles in the glenoid fossæ. The voluminous and complicated writings describing the importance of these movements include much exaggeration, are very confusing to the average practitioner, and have a tendency to retard rather than advance the general betterment of prosthesis.

But while the essayist believes that the greatly exaggerated importance of these scientific measurements has had a discouraging effect on the profession as a whole, yet great praise is due these investigators for their admirable work. It is a consequence of their efforts that Hall has been able to see the impracticability of much that has been presented, and has introduced into his method a wholesome amount of good common sense in addition to the scientific principles involved.

TECHNIQUE OF IMPRESSION TAKING.

The one great outstanding feature of Hall's method of impression taking is its accuracy. There must be an exact impression of the field examined—an actual negative copy of the parts taken in their natural, normal positions, without distortion or displacement of the soft tissues whatsoever. All the available surface is given the utmost consideration in order to give to the future denture the necessary stability, as well as a broad, flat seating surface, and to shut out all possible means of ingress of air. With these thoughts in mind, then, the closest possible attention is given to the examination of the mouth. The operator must form from his investigations a mental picture of the field to be utilized, and so firmly fix it in his mind that he will be able to recognize its accuracy immediately upon removal of the impression from the mouth.

EXAMINATION OF THE MOUTH.

For the sake of convenience in description of the examination we shall call the spaces usually found in the posterior part of the buccal cavity located between the cheek and the alveolar process, the right and left posterior buccal spaces. Beginning with the right posterior buccal space we estimate the height of the space from a level with the crest of the alveolar ridge to the arch forming the roof, and the width from the alveolar process to the buccal wall. Anteriorly from this space we note the downward inclination of the soft tissues to the region of the malar process of the maxilla. At this point we stop to determine the height of the muscular attachment on the alveolar ridge, and its flexibility. Passing from this point forward, we again note the upward inclination of the soft tissues in the region formerly occupied by the cuspid teeth. A gradual downward inclination of the soft tissues follows here to the labial frenum at the median line. Beginning again at the left posterior buccal space, the same order of procedure is followed to the median line on the opposite side of the maxilla. Next in order we examine the condition of the tissues overlying the alveolar ridge and hard palate. A careful digital examination is necessary to ascertain the density of the tissues, and to plan if necessary a possible means of relief.

In the examination of the lower jaw the same general plan is followed as in the upper. Every possible means is exerted to determine from the examination the accuracy of the impression. Like the upper, the lower also has two valuable spaces for retention generally overlooked in other methods of impression taking. These spaces, which are better known as the posterior lingual spaces and lie on both sides of the tongue, should be utilized to the fullest extent, since they form valuable aids in preventing horizontal movements of the denture.

INDIVIDUAL TRAYS.

In each case an individual tray is demanded. The S. S. White Co., following

the suggestion of Dr. Hall, manufactures an impression tray compound for this purpose. This compound possesses all the ideal qualifications necessary for tray construction, and is used exclusively in the technique of this method. It is black in color, softens quickly, and is not sticky except when immersed in very hot water. It sets rapidly, is not easily distorted, and can be cut easily with a sharp penknife.

MODELING COMPOUND IMPRESSIONS.

In performing the technique of taking the modeling compound impression an S. S. White metal tray is selected, a little larger than that ordinarily used in other methods of impression taking. The rim is cut and trimmed to follow the rise and fall of the soft tissues, generous relief being given the full extent of the rim to allow a substantial body to the periphery of the compound impression. The necessary amount of compound is then softened and evenly placed on the tray and the surface passed over a flame to give it a glaze. It is again immersed in hot water to prevent adhesion to the soft tissues, and is then placed in the mouth and is brought to position with a firm, even pressure, and allowed to remain a minute or so to prevent distortion upon removal.

All overhanging material is removed from the sides of the tray, to facilitate removal of the tray from the compound. This being done, one or two taps on the handle of the tray will usually cause a separation.

The essayist wishes to emphasize the importance of the compound impression. The technique must not be carried out in a careless, indifferent manner. This is the foundation upon which future success depends, and it must approximate in every detail the finished impression.

TRIMMING THE TRAY.

All the information gained in the course of examination of the mouth is now utilized in trimming the compound trays. In trimming the upper the same general outline given in detail under that head (Examination of the Mouth) is followed in establishing the proper inclinations of the periphery from the median line to the posterior buccal spaces. The whole extent of the periphery is then reduced a little below the turn of the compound, and is given a slight bevel inclining away from the palatal side of the rim. Beginning on the labial surface it is trimmed back thin in the center to prevent pointing of the lip, and is gradually widened to the cuspid region to give that portion the desired fulness. It again narrows to the attachment of the buccal muscles. Posterior to this point it is given a little less width than estimated in the examination. The full extent of the buccal and labial surfaces is given a slant inclining away from the established width of the periphery to that portion of the tray representing the alveolar ridge, allowing space for the excess plaster which otherwise would create an unnatural fulness in the cheeks and lips.

We next direct our attention to the palatal surface and the posterior border, having in mind that the only pressure exerted in taking the impression is the natural pressure of the tongue. We trim and conform the palatal surface to its approximate shape, so that when placed in position the tray will have a firm, even pressure directed over the whole central portion of the base. The posterior border of the tray is trimmed to approximately the junction of the hard and soft palates, but in the essayist's opinion should always extend as far on to the soft tissues as can be comfortably borne by the patient. The prepared tray is then placed in the mouth and the spaces provided for the frenum and muscular attachments, and the periphery examined to determine their correctness. Finally, all overhanging points caused by undercuts are removed and liberal spaces allowed for soft, flabby ridges in the interior of the tray.

The same thoughtful consideration is given to trimming the lower, in order to obtain proper establishment of the periphery, contours, spaces for muscular attachments, and the lingual flanges, which should be well extended into the

posterior lingual spaces. Trim and contour the upper surface of the compound tray so that when the cheeks and lips are relaxed in the rest position they will assume their natural, normal location in the later plaster impression technique which is to follow.

PLASTER IMPRESSIONS.

In performing the technique of the upper impression, the rubber bowl is partly filled with water, a little salt being added to hasten the setting. The finest grade of French's plaster is sifted into the bowl until a little less than complete saturation occurs, and is quickly spatulated to give a smooth, even mix. The tray is then dropped into the bowl to give the palatal surface an even coating. It is now removed, a little plaster from the bowl is poured into the anterior portion of the tray, and the excess allowed to run off at the heels. The operator having assumed a position to the right side and slightly back of the patient, the tray is introduced into the mouth with the posterior border in advance and the cheeks pressed outward as the tray is advancing. The lip is then grasped in the center and brought forward, the tray leveled and with a gentle wave motion carried almost to position. The lip is now allowed to assume its normal rest position, and the whole surface of the tongue is brought in contact with the base of the tray to complete the pressure. The mouth is closed in the rest position and the impression allowed to remain until the plaster sets.

After a sufficient time has been allowed for the setting to occur, the impression is removed from the mouth and carefully examined. The black compound will indicate all points of undue pressure by its appearance through the plaster over the palatal surface and periphery. These points are relieved and the same order of procedure repeated. If on removal of the second impression the periphery shows a smooth, even roll, without any muscle strain, and the palatal portion an evenly distributed surface corresponding in every detail with the mental picture formed from the original examination, we may feel assured that we have taken an accurate impression.

The technique of taking the lower impression is similar to that of the upper, with two exceptions, namely, the position of the operator in taking the impression and the method of introducing the tray. The patient is first directed to place the tip of the tongue in the anterior portion of the palate. The operator assumes a position directly in front of the patient and passes the tray under the tongue on the left side first, then brings it to position on the right, pressing the cheeks outward as he proceeds. The lip is grasped in the center and brought forward, and the tray allowed to settle of its own accord. The lip is now released, the two index fingers are placed in the region of the bicuspids, and gentle pressure is exerted. The tongue then assumes its normal position, with the tip resting on the anterior portion of the tray. The mouth is closed and the impression allowed to remain until the plaster sets.

If the technique is properly carried out and the plaster mixed to the right consistence to cause a free, even flow, one will marvel at the beauty and accuracy of the impression.

ADVANTAGES OF PLASTER OVER OTHER METHODS OF IMPRESSION TAKING.

Hall's method of impression taking promises more uniform success with the lower jaw than does any other. It makes possible a stable, firmly seated denture, heretofore difficult of accomplishment even with the improved modeling compound technique. It demands careful attention, however; the operator must be exacting in every detail in order to be successful.

The underlying tissues are not subject to such great changes as occur under dentures constructed from impressions obtained by the so-called pressure method. It is absolutely impossible for one to determine with the fingers the amount of pressure to be exerted. Unnatural pressure is a detriment rather than a help;

it hastens the absorption of the hard tissues and causes an early loosening of the denture. This does not occur so rapidly in Hall's method, and accounts to a large extent for the continued stability of the denture. A slow, uniform absorption takes place and allows the denture to gradually and evenly follow its progress; for this reason relief is only necessary in extreme cases.

The physical aids of retention are exercised to their fullest extent. More surface is exposed to the force of atmospheric pressure, with a relative addition of adhesion and cohesion, without any corresponding increase in the weight of the denture.

It establishes more correctly the height of the periphery and provides more broad, flat seating surface for the base of the denture than any other method. It also eliminates all possible means of ingress of air and reduces the possibilities of soreness to a minimum.

Greater opportunities are offered in restoring the facial contours and exercising all other esthetic possibilities.

TECHNIQUE OF CAST AND BASE-PLATE CONSTRUCTION.

It is of the utmost importance in performing the following steps in the technique to be exacting in every detail. In order that we may eliminate every possible chance of destroying the accuracy of the impression, we must have a material that exhibits the least susceptibility to expansion and contraction in preparing the casts, and hard enough to prevent distortion under pressure. Spence's plaster possesses these properties and seems the ideal material for the purpose. The casts must be trimmed and prepared in such a way that we may obtain from them a base the exact duplicate of the finished denture to insure stability and accuracy in taking the bite.

FLOWING THE CASTS.

A portion of the compound is softened in hot water and rolled out flat on the bench. The impression is then placed in the center of this flattened compound and encircled with a metal strip inserted in the compound allowing a space around the entire periphery a fourth to a half inch in width in order to provide on the finished cast a substantial margin. Spence's plaster mixed to a consistence equal to soft putty is carefully worked into the impression made by the alveolar ridge. It is then placed over the palatal portion and gently patted, larger pieces being added and jarred into position to eliminate bubbles and give the surface of the cast a smooth, even face. It is now set aside until it thoroughly hardens.

SEPARATING THE CASTS FROM THE PLASTER IMPRESSION.

After a sufficient time has been allowed for a complete hardening to occur, the metal strip is removed and the compound softened and carefully withdrawn from the cast. The plaster is broken away and the cast is ready for trimming. In trimming the cast a strong knife and coarse files are necessary, because of its hardness. The margins are reduced to a point an eighth of an inch or so above the turn of the periphery of the impression at its outer margin and follow the full extent of the outline. The object sought for in trimming is to preserve the whole surface of the periphery on the cast.

CONSTRUCTION OF THE BASE-PLATE.

The same method is followed in the construction of both upper and lower base-plates. A sheet of Alston base-plate material is placed over the cast and heated with the blowpipe until it softens and partly falls into position. It is then carefully adapted to the palatal surface and the alveolar ridge with the fingers, care being taken not to allow it to extend far enough over the ridge to include the undercuts. It is then trimmed with a hot spatula and removed from the cast, and the margins given a smooth finish with a file. It is again placed in position on the cast and a sheet of tinfoil is burnished over the entire

surface, allowing it to extend well beyond the outer margin of the peripheral groove. The full extent of the peripheral groove is then filled with rolls of soft beeswax, and a sheet of base-plate wax softened and uniformly adapted to the whole palatal portion. This is then trimmed and the base-plate is removed from the cast and given its final finish. The finished base-plate is again returned to the cast and tested for accuracy of fit, and corrected if necessary. A roll of soft wax is then fitted and molded to the alveolar ridge, following its form and approximating as near as possible the desired length of the bite rim in the mouth.

If care is exercised in performing the technique, this insures us a base-plate the exact duplicate of the base of the future denture, having a similar suction, and one that is not easily distorted and can be accurately fitted to the cast on completing the bite.

TECHNIQUE OF TAKING THE BITE.

Of all the various operations performed in the mouth, in the essayist's opinion none is so difficult of accomplishment as the establishment of the correct relation of the upper and lower jaws in taking the bite. The operator must have fixed in his mind the possible restorations, from knowledge gained in a close study of the face during this and previous engagements. He must be skilful technically and be possessed with a wonderful patience in order to determine the accuracy of the work as he proceeds.

In determining the length of the upper bite, the lip line with the muscles and mandible relaxed are used as an approximate guide only. It does not indicate truly the subsequent position of the teeth. In this position the lips are extended to their full length, and if accepted as a point of location would make the teeth entirely too long. It requires some effort on the part of the muscles following relaxation to bring the mandible to a position of occlusion without causing a contraction of the muscles and a slight compression of the lips. This position would indicate more accurately the bite, and careful judgment must be exercised by the operator to recognize this distinction, which is so necessary in esthetics and efficiency in the finished denture.

In determining the length of the lower bite the lip line is again used only as a guide. The bite is trimmed below the level of the lip to a point representing the desired length of the underbite. If it were allowed to remain on a level with the lip and an attempt made to establish an underbite, the teeth would stand above the lip the distance corresponding in height to the depth of the established underbite. You will readily observe the fallacy of the accepted rule governing this point, namely, to trim the bite to approximate the line of the lips.

No attention is given to any predetermined method of establishing the plane of occlusion. The posterior occluding surfaces of the bite plates are trimmed and fitted to accommodate the case in hand, striving only to keep the surfaces uniform and to equalize as nearly as possible the distance between the jaws without disturbing the established bite length in the anterior portion.

The posterior occluding surfaces of the lower bite plate, that is, the surface extending from a point in the region of the cuspid teeth to the distal border, are purposely allowed to remain a little higher than the established bite length of the lip portion. This posterior portion is then heated deeply with a hot spatula, the bite plates are placed in position in the mouth, and the occluding surfaces are brought in contact with the jaws to complete the bite. The bite plates are then sealed together with a hot spatula, the median, high, and low lip lines indicated, and the bite removed and mounted on the articulator.

Many tricks and methods have been presented as aids in establishing the correct location of the lower jaw, such as turning the tip of the tongue back into the posterior part of the buccal cavity, swallowing, etc.; the final test, however, depends entirely upon the operator's knowledge of individual facial expression. By this means alone must he determine the accuracy of the bite.

USE OF THE ARTICULATOR.

The Hall articulator is something entirely new and is a real marvel in precision of adaptability to varying conditions in the human jaw. In its construction the attempt has been made to utilize every known law of science applicable, and the absolute exactness with which the normal movements and occlusion of any jaw can be copied is something that hitherto has been impossible of certain attainment. The troublesome face-bow adjustments of other systems—not mentioning time lost in such adjustment and possible inaccuracies of measurements in the end—are wholly eliminated. In other words, the Hall articulator combines accuracy with simplicity, a knowledge and application of strictly proper technique giving absolute assurance of success.

Any further description of the geometrical and mechanical principles upon which the articulator is constructed would be an imposition on the valuable time of the busy practitioner. He is concerned in the service it will render in a practical way rather than in a detailed description of its development. It possesses several particular advantages, however, which the essayist believes will be of special interest to the profession as a whole—namely:

A rotary movement which resembles more closely the movements of the lower jaw than in any other articulator. This movement because of the point of control permits a graceful, free swing not permitted by other articulators. It would require a very exacting and complicated apparatus to produce these movements with the point of control at the base of the triangle, or, practically speaking, in or near the condyles; but these movements can be produced by a very simple apparatus when the point of control is at the apex of the triangle as Hall has arranged it.

Another advantage is the forty-five-degree-angle guide plane located anteriorly to the apex of the triangle which establishes the articulating and occluding surfaces of the teeth, and which subsequently guides and directs the movements of the jaw during the process of mastication.

The next advantage is a removable bite jig which establishes the bite at an average distance from the base of the triangle or centers of the condyles, and eliminates entirely the use of the face-bow. The distance is based on the measurements of Bonwill's equilateral triangle.

Another great advantage is that the articulator may be set so as to permit only the opening and closing movement. This, along with the supporting pin at the apex of the triangle, greatly facilitates the arrangement of the teeth and eliminates much annoyance in retaining the line of occlusion as the work proceeds.

TOOTH ARRANGEMENT.

So much depends upon the proper arrangement of the teeth in the restoration of the lost masticating surfaces and the establishment of the natural appearance of the dentures, that it is absolutely necessary for the operator to have a full appreciation of the position and inclination which each tooth shall bear to the median line; or, in other words, he must have a definite reason for the position of every tooth and know exactly what the position means. The teeth are arranged with two definite purposes in view, *i.e.* appearance and mastication, and should be made to accomplish both purposes as fully as possible.

Many methods of manipulation in arranging the teeth have been presented, all of which have a reasonable degree of merit and will greatly aid in the procedure if used as a guide. Any set rule, however, governing a definite order of procedure in setting the teeth may be disregarded entirely. The results are the same, no matter where you begin.

Another feature which may be eliminated is any attempt to establish, by trimming and contouring the bite plates, the subsequent positions of the teeth. It is an absolute impossibility to determine in this manner what the arrangement shall be. This is determined entirely by the conditions to be met; it would be necessary in many cases to greatly modify or discard entirely any predetermined plan or arrangement on the bite for this purpose.

Following the arrangement of the teeth, the trial plates are removed from the casts and the wax given the final finish. This is possible only with bases made to accurately fit the casts and rigid enough to prevent distortion on removal. No other method offers the same advantage in estimating the palatal thickness and other esthetic requisites.

VULCANIZATION.

The technique under this head is not by any means so unimportant as generally considered by many practitioners. In fact it is the most important of all, and requires the closest possible attention to detail in investing, packing, and vulcanizing to retain as nearly as possible the true form of the finished denture. It would be folly indeed, after the performance of such a careful and exacting technique as has been described, to turn this part of the work over to incompetent and indifferent mechanics. The operator, to be successful, must perform the technique himself, or have a competent assistant working under his direction.

TAKING THE CORRECTIVE BITE.

The finished dentures are placed in the mouth and closely examined in order to determine the accuracy of the proposed corrective bite. The lower is then removed and a thickness of base-plate wax is adapted to the occlusal and incisal surfaces of the teeth and attached with a hot spatula. The waxed surfaces are now slightly softened and the dentures again returned to the mouth, the patient being directed to bring the occluding surfaces of the upper teeth in contact with the wax on the lower until the first indication of resistance is felt. The dentures are now removed from the mouth, firmly waxed together, and mounted in the established position, using the same order of technique as in mounting the original bite. After having removed the jig and wax from between the teeth, loosen the set-screw controlling the movement, and the teeth are ready for grinding.

GRINDING THE TEETH.

Cover the occluding surfaces of the lower teeth with a generous coating of carborundum and glycerin, and cause the articulator to perform the necessary movements by grasping the pin in the center and allowing its point to follow the established path of the forty-five-degree-angle guide plane. Continue the movements until fully satisfied that the articulating and occluding surfaces of the teeth have been properly ground to accommodate all the varying positions that the jaws may assume.

After having established the control planes on the surfaces of the teeth it is of the utmost importance to have the patient fully realize their purpose and use; and in order to obtain the full benefit of the arrangement in the mouth, a practical demonstration of the established movement is made with the articulator and the patient directed to imitate it as nearly as possible with the jaw.

The theory of having the forty-five-degree-angle plane guide to direct the movements of the jaw is contrary to all other teaching, and in the essayist's opinion will be the basis upon which the future success of prosthesis will depend. It simplifies the procedure, is more easily understood, and will be responsible in a large measure for a more rapid advancement in the prosthodontic art.

CONCLUSION.

By a close study of the carefully planned order of technique that has been presented, it will be readily observed that the successful construction of full upper and lower dentures does not depend upon exacting and complicated measurements or any particular make or type of articulator, but upon the patience, skill, and common sense of the operator working with an apparatus which approximates the movements of the jaw to aid him.

It has been the aim of the author in the presentation of this paper to simplify rather than complicate the procedure, in order to stimulate, if possible, a greater interest in the art and science of dental prosthesis.

COMMONWEALTH BANK BLDG.

The Past and Present of Operative Dentistry.

By B. HOLLY SMITH, D.D.S., Baltimore, Md.

(Address delivered at the fiftieth anniversary meeting of the Dental Society of the State of New York, Saratoga Springs, June 13–15, 1918.)

Mr. President, Ladies and Gentlemen:

I AM glad to come to New York, because of the fact that I have many friends here, and also the recollection of so many interesting occasions.

The interest that New York has always had in dentistry seems to me to be clearly shown by a casual survey of the early organization of our profession. In New York State there has always been a forward look. We had Dr. Carr tell us this morning something of the history of this organization up to date. (I told Dr. Carr I was mighty glad to hear him again in his old belligerent attitude.)

The organization of dentistry into the American Society of Dental Surgeons was accomplished here in New York, and its successor, the American Dental Association, which was the outgrowth of the American Dental Convention, was formed here also. I have a quotation here from Dr. Chapin A. Harris, showing the intimacy of the men who worked in Baltimore with the men in New York who had to do with the first institutions of teaching dentistry—the responsibility they felt for the advancement of dentistry, and the co-operation of the men of New York with these men in the organization of the first semi-national association known to dentistry.

As early as 1817, Dr. Hayden proposed the formation of a national dental society, and visits were made to Philadelphia, New York, and Boston to further this purpose; and yet it was not until 1840 that some fifteen or twenty men met in New York to organize the "American Society of Dental Surgeons." Dr. Hayden was elected the first president, Dr. Harris secretary. Three years later, this association, numbering one hundred and twenty-five members, met in Baltimore, and Dr. Harris in his address said:

> In all great movements, either in religion, politics, science, or benevolence, the American character and the popular genius of all our institutions immediately direct us to lay hold on the great principle of voluntary association, as an agent of stronger moral power than any known in the country, to effect any desirable good. We have no wealthy and powerful privileged orders to command any given amelioration or improvement, and hence we combine the power of popular number and bring it to bear upon the objects we desire to accomplish. This national peculiarity accounts for the numerous benevolent and scientific associations found in the United States, before the moral power of which, vice, ignorance, empiricism, bigotry, oppression, and long-established habits and modes of thinking are fleeing away like mists of the morning before the rising sun. This will furnish the reason why America can boast of the first society of dental surgeons ever associated together in the world; and if this association shall produce results in any manner comparable to those produced by other American associations, now the wonder and praise of the world, the character of an American dental surgeon will stand as high on the archives of science as do the names of Washington, Franklin, Hancock, Henry, and Jefferson on the roll of freedom, or Mills, Judson, Perkins, and Hill in the annals of American missionary benevolence.

The American Society of Dental Surgeons was succeeded by the American Dental Convention, a body without constitution or by-laws—a simple meeting or

conference. This organization was of short duration, and was itself succeeded by the American Dental Association, which held its first meeting at Niagara Falls in 1859. This was from the first a delegate body and had a successful and continuous existence until merged with the Southern Dental Association into what we now proudly recognize as the National Dental Association.

GOLD FILLINGS.

A short time since I purchased a book, written in the City of Brotherly Love, which said, in the 43 pages devoted to the "stopping" process, that the hammered gold filling was ridiculous and obsolete. That was all that was said about gold fillings. It is interesting to know that in the time of Chapin A. Harris, whom I quoted in the early part of this address, dentists beat out their gold from the coin of the realm, and made fillings many of which are still in the places they were meant to fill. Those operators, of course, were few.

I do not believe Robert Arthur ever discovered cohesion. I think anybody who ever handled gold or gold foil must have discovered its cohesion and done everything they could to subdue that quality. Robert Arthur, however, got the credit for it, because he wrote a treatise on it, and thus opened a field that had not yet been occupied. Varney, Bonwill, Webb, and many other splendid operators later demonstrated the possibilities of cohesive gold.

It has been some time since the rubber dam and the electric mallet were considered of much importance, but for a long period they were the sheet anchor of the dentist. I do not know that I have a right to say this, but it seems to me a sort of disintegration of moral and ethical character to be swept off our feet because something new comes up:

> Be not the first by whom the new is tried,
> Nor yet the last to lay the old aside.

Do you remember J. Foster Flagg and the time the journals were so full of what was called the "new departure"? He said he would never put in another gold filling as long as he lived, and an army of men said they would not either.

I do not believe you think the hammered gold filling is obsolete even yet, but there are many men in dentistry who would be glad to have an excuse not to hammer fillings, because they never did it properly.

I would like to make a plea for a partial return to the use of gold in filling teeth. The "new departure" only gave accentuation to a slovenly kind of work—for men who did a kind of crazy-quilt work. The dentist, I have always contended, is responsible to his patient and the profession for the well-being of the patient and for the esthetic effect of his work.

The non-cohesive gold filling had and still has its place in dentistry. I know Ottolengui never knew how to use it, because I have read his book; and naturally he did not find out its possibilities as I did. I believe every man should be armed with a variety of weapons, and be able to use just the one best suited to each case. I have heard men who were in practice twenty-five or thirty years say: "Well, I'm going home to try some of this non-cohesive gold." Now, I do not advocate it always, but there are times and places where it can be used effectively to the relief of the patient, and a cumbersome operation avoided. In my opinion it still has a place which cannot be taken by the inlay or any other material or procedure.

Think of what instruments have been invented, what splendid methods and technique developed, by the skilful use of cohesive gold. Are we to do without it entirely?

There are three factors that should influence a man in the selection of material for stoppings. First, he must have some consideration for suffering caused the patient. I felt very resentful toward this man [Dr. Stillman], who said everybody was against the dentist and children dreaded him. Why, children come to my office to play with the instruments I have in the office—and incidentally to have some dentistry done. It is not true, as

Judge McKelvie said this morning, that it takes as much force to drag a ten-year-old boy to the dentist as it does to take a drunken sailor to the lockup. I do not think any of us like steel on our teeth; it is a human and natural aversion; but dentistry is practiced today practically without pain. Secondly, there is the factor of the time required to do the work; and thirdly, that of the esthetic appearance in the mouth.

I have always thought the dentist must not only be a practitioner, but a teacher; but, God save the mark! I do not think the dental depot man has any business to teach the dentist what material he should use, and how he should use it. If he knows better how to use it, it is of course well for him to show us; but I think many men have been started on the wrong course in this way. I remember the man who came into our offices crying "Archite! Archite!" It ought to be written on his grave! There is a story of a certain man who would go out with his friends, partaking of everything they had to offer, but never spending any money himself. He disappeared, and someone asked: "Where is Jim?" They learned that he had died, and went out to the graveyard. There was Jim, six feet under, and over him was a little tablet: "This one is on me."

We had the same thing with artificial enamel. Those things were taken up because a drowning man clutches at a straw. Many men, because of their inability to use a certain excellent material, will grasp at any substitute. The artificial enamel was a godsend to such a man and his patients, and he was glad to bolster it up with anything the dealer might say. It was a failure in the most favorable sites, and many times poor discretion made it worse.

After all, it is not the material that determines the value of the filling, but it is the dentist who uses it. There is the man who sends the propaganda through his patients into the ears of your patients and mine: "Dr. So-and-so has a material that represents the tooth structure exactly, it does not hurt to have it put in, and it can be easily adapted to preserving the teeth." That was poured into the ear of that person by the agent of some dental dealer, and that preaching has been to our students and to our young practitioners a great detriment, and we should guard against it. I give the dealer credit for many things. He has a large share in the usefulness of dentistry. He does it because he wants to make money out of what he produces, and he is entitled to do so if he produces the right thing.

Then there is the man who tells you about "silicious cement." He sets his inlays with "silicious cement." I would expect them to fall out unless they were well seated.

All honor to Dr. Black in his work for correct cavity preparation; we honor him wherever his name is mentioned. But Dr. Black was the leader of a camp, and many of his followers went under. Unquestionably a great amount of benefit has been derived from the proper preparation of cavities, and Dr. Conzett, who is one of the exponents of this, came to Baltimore last week, and gave us his ideas on the beveling of the cavo-line, which is of course very desirable for inlays. I said, "You come here to talk on operative dentistry, and you talk on gold inlays, and that makes me mad. Have you given up making gold fillings?" He said, "No, but that seems to be the most popular way to do it." I would not have my boy as a dental student be without the technique which he develops from the manipulation of varied forms of fillings, for anything in the world. He can train a girl in a few weeks to cast his inlays, and he can do his preparation of the cavities in his office in a little while. Dentistry is getting to be "easy," and I do not think we should consent to it. It is a slacking down, and a warping of the moral character of the operator, to say he is willing to give up that which we know has been so good, and go off into this new camp.

I know I have only touched a few phases of this subject, and the other gentlemen will bring out more interesting data than I have. I did not say anything about the combination of gold with other

materials. We have seen that at the clinics, combinations with cement and even with amalgam, the Morgan-Hastings gold, the Steurer's gold, and the other plastic forms which were a contribution to making gold filling easy.

There are few things I have ever seen for which I had a greater feeling of admiration than a certain mouth I saw —a patient of the late Dr. Perry's. There were no inlays. The mouth was clean, and it looked as fresh and sweet as a mountain spring. The saliva was free from any taint; of course it was a healthy subject, but the mouth was beautiful because of the splendid care of Dr. Perry. Could anyone persuade me that there could have been any error in the use of the materials Dr. Perry resorted to in the treatment of that mouth, and all the other mouths that came under his care? Of course, we can count the distinguished operators on our fingers, but that should not deter us from trying to imitate them. There are hundreds of men who have never come to the front in the conservation of tooth structure, and I suppose it is natural that they should be hunting some easy road to success, but let us not give up all that training which made the American dentist so peculiarly deft and skilful in the use of his fingers.

I used to fight with old Dr. Bonwill about his patents. He spent almost a whole night with me arguing about it—it was somewhere in Kentucky—and the burden of his argument was that the things he had done that were really valuable he had given to the profession, one being bibulous paper, with which to pack amalgam. I have seen some of the plus amalgam fillings of Bonwill that were the envy of my life. They had been well made, and were lasting. These combinations of other materials with gold are still of value, and there is no reason why they should not be used.

I have wondered how it was that sometimes I saw, in the silicate cement I used, that brown line. I have seen silicate cements put in little tubes, dropped in water and then shaken up; it was evident there was a contraction. Dr. Head says these are indestructible and they stand wear. They will not stand wear when exposed to occlusal stress, and they are not satisfactory to build up angles. I have resorted to these silicate cements in facings, instead of showing the gold, but the man who says it should be substituted for more durable materials, I think, is wrong.

405 N. Charles st.

[See also *Discussion*, as reported under "Proceedings of Societies," this issue.]

Topics of the Day: Curetting, Ionization, Pulp Testing.

By C. EDMUND KELLS, D.D.S., New Orleans, La.

The Curet.

THE word curet is frequently met with in the literature of the day, or rather has been frequently met with in comparatively recent magazine articles, and yet it is not to be found mentioned in many of the standard textbooks that are now in use.

HISTORY.

In the early days of the writer's practice, the amputation of root-ends, *when indicated,* was advocated by the most advanced operators. As there were no X-rays in those days, the "when indicated" was largely a matter of guesswork. When an abscess could not be cured, the supposition was that the root-end was roughened and therefore the abscess could not heal, and the sinus would not close.

The operative procedure then was to drill with the engine and a round bur through the gum tissue and alveolus—taking them just as found and without any preparatory treatment—and when the root-end was struck (?) to round it off nicely with the bur, and at the same time curet the abscess tract.

One can well imagine that the successful apicoectomist in those days was blessed with a vivid imagination, although, in this connection, one can safely say he did not differ greatly from a lot of our modern operators when vivid imaginations are taken into consideration. Be that as it may, the writer, having always been afflicted with an absence of imagination when it came to observing results, gave up curetting after a few naturally unsatisfactory attempts made in this manner.

THE SURGICAL CURET.

Within the past few years curetting has been revived, but this time the operator, evidently realizing that the engine bur was unfitted for the purpose, turned to the regular catalogued curets found in surgical supply houses, as there was nothing in that line in the dental depots at the time, and these are the curets that are used by all of the operators of the day, or at least by all operators who write or clinic upon the subject.

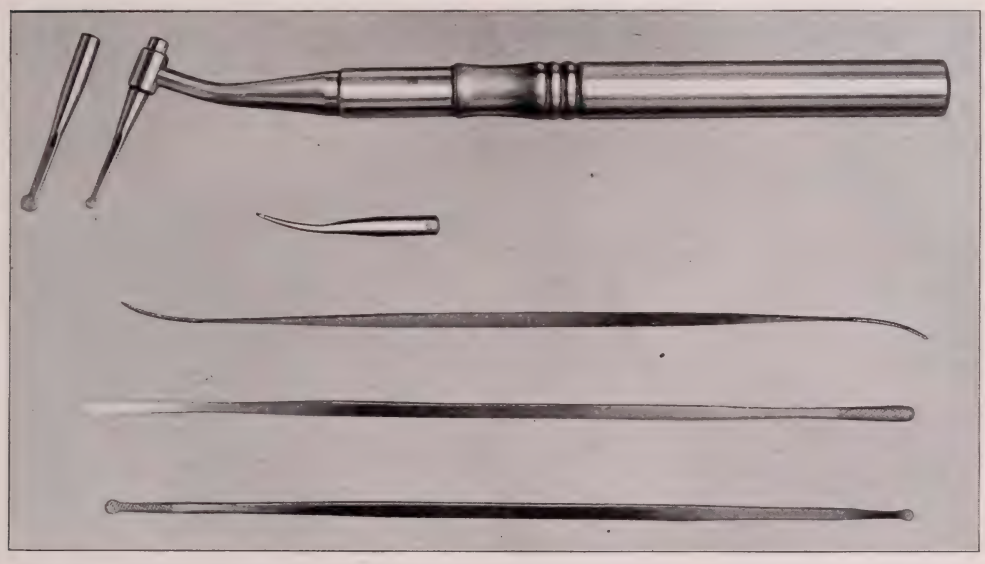
It so happens that for very many years replanting has been the writer's last resort for the cure of otherwise incurable abscesses, and many such abscesses have been cured without any curetting of the sockets. This proves conclusively that in every one of those cases at least, curetting was not necessary. Notwithstanding these results, upon a careful consideration of the subject it was realized that the immediate removal of the abscess sac from the socket (when it did not come away with the root when extracted) by means of a curet was undoubtedly a better procedure than leaving it there to be removed by the slow process of nature.

Immediately upon reaching these conclusions, the search for suitable curets naturally followed. The surgical curets of the day were found to be all built upon the same plan; they were of different sizes, some with curved shanks and some with straight, some being rights and some lefts.

While the general style of the instrument varied more or less, the curet proper, that is, the cutting end of the instrument, is practically of only one shape. It cannot be called spoon-shaped nor yet cup-shaped; it has rather a dis-

tinctive shape of its own, and this very shape is the *raison d'être* of this paper, for in the writer's mind this is about the most unsatisfactory, the most inefficient shape imaginable for dental work. It undoubtedly was primarily conceived by some surgeon for some surgical work, and probably was very well adapted to the work in question, but this did not necessarily fit it to dental work.

Fig. 1.



THE TEST.

It is only necessary for a careful operator to take an old skull, remove some of the teeth therefrom so that the sockets shall be perfectly natural, and then carefully go through the motions of curetting these sockets with the curet to be found upon the market. It is firmly believed that the more careful and more thorough the operator, the less would he be satisfied that he had thoroughly curetted the sockets in question.

Undoubtedly these instruments remove a good portion of what it is desired to remove, but their very shape precludes the walls of the socket from being well scraped all over, and as for reaching the bottom of the socket, that is simply impossible. This portion can only be touched by the oval part of the curet, and not by its cutting edge.

It may be possible, of course, that the writer is altogether wrong, that these surgical curets are especially well adapted to dental work, and that the reason he could not satisfactorily use them was due entirely to his own fault, and not to any defect in the instrument.

A NEW CURET.

Be that as it may, he certainly could not do the work to his own satisfaction, and so an entirely different curet was devised, with which he is well convinced that every part of any socket or abscess tract can be reached and thoroughly scraped.

In these days, when many of our instrument-makers appear to have been drafted into other lines, one must rely to a great extent upon himself for anything out of the ordinary. Fortunately, in this instance, a lot of standard files were in stock from which some of the curets in question could readily be made. In the illustration Fig. 1 an original file and the new curets are shown; that the

curets made from the files are not finished and nickeled does not interfere with the results obtained.

The straight instrument is suited to accessible sockets only. In order to overcome the natural objections to right and left curets for sockets inaccessible to the straight instrument, the right-angle instrument, as shown, was devised.

THE ADJUSTABLE CURET.

This consists of an ordinary S. S. White porte-polisher in the end of which is secured a short curet. It is operated as follows:

A curet of the desired size is placed in the handle so as to first curet, we will say, the mesial wall, and that portion of the wall then coming within reach is thoroughly scraped. When this surface is satisfactorily scraped, the curet is removed from the socket and rotated slightly in the handle (there being a small hole drilled through the upper end of the curet so that it can be rotated by means of a point), say buccally, and the buccal portion of the wall, then coming within reach, is scraped. This is repeated—the scraping of the accessible part of the wall—and then the rotating of the curet in the handle until every vestige of the socket has been thoroughly curetted. The shape of the instrument is such that the bottom of the socket can be as well scraped as its sides.

Naturally, the sharper the curet the better it is adapted to the work. One of the advantages of this instrument is the ease with which it can be sharpened, as it is "hollow ground" on the order of a razor. Its sharpening reduces its size so that only the larger size will ever need replacing, the smaller sizes *coming along* all the time.

CONCLUSIONS.

The writer knows very well that every time *he* undertook to curet a socket with the original curet, there was a world of "camouflage" about the operation, which was very unsatisfactory to say the least, and it certainly was a relief to his mind when he began to work with these new curets, from which moment the camouflage was eliminated.

Ionization.

Some twenty-five or thirty years ago, while attending a meeting of the old American Dental Association in Niagara Falls, the writer was persuaded to take up the use of ionization—then called cataphoresis—by a most enthusiastic dentist, who gave the most glowing accounts of its wonderful possibilities. Immediately upon his return home the cataphoresis apparatus was installed, and time and time again were abscesses "treated" in this manner, without any results whatsoever as far as the writer could see.

To be enthusiastic is a wonderful and in fact a very necessary asset, but enthusiasm should be based upon practical and not imaginary results obtained. With absolutely nothing but negative results, ionization, masquerading under the name of cataphoresis, was finally given up in despair.

THE OBJECTION TO IONIZATION.

Theoretically, ionization might be all right, and undoubtedly it is all right with those who use it successfully, or rather satisfactorily, for bear in mind there is a world of difference in the meaning of the two words. Ionization is too intangible for the writer. There is nothing definite nor positive about it. Some experimenters have proved it possible to accomplish certain definite results with it, while other experimenters of equal standing are just as firmly convinced in their views that these results never were accomplished.

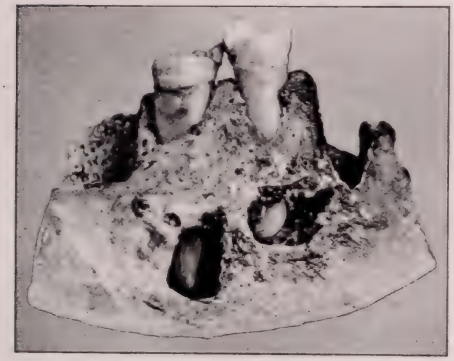
The object of the procedure is to destroy the organisms beyond the end of the root when they are present. While the writer apparently cannot accomplish this by means of ionization, he certainly can do so in most cases, if not all, by the application of phenol under pressure. So many cases have yielded to this treat-

ment that long ago it became routine procedure in the treatment of putrescent pulps. As the details of this process have already been published* they will not be repeated here.

A PRACTICAL DEMONSTRATION.

The writer belongs to that large class of practical men who believe that it is easier to do good dental work on a skull at the laboratory bench than it is to accomplish equal results for an obstreperous patient in the chair. Consequently, what he can do in the mouth he certainly can do outside of it.

Fig. 2.



In Fig. 2 is shown a photograph of a lower jaw with a first and a second bicuspid as the experimental teeth. The bone around the apices of the two bicuspids was carefully burred away, making two independent and non-communicating abscess cavities. The porous surfaces thus left exposed were coated with wax to render them impervious. The cavities were filled with cotton thoroughly infected with organisms, then sealed over with sealing-wax, and thus first-class abscesses were simulated.

The teeth were then treated by this pressure method. The second bicuspid having been opened through into the abscess, a successful result was expected. With the first bicuspid it was different. It was not possible to open the canal through into the abscess, and consequently a failure was expected. After these *treatments* (one sitting) the case was returned to Dr. Foster M. Johns, who had infected the cotton, with the report that the first bicuspid's abscess would not be sterile, while the abscess under the second bicuspid should be sterile, and his tests proved the correctness of this assumption, for every vestige of infection was gone under the tooth which was supposed to be satisfactorily treated, while the abscess under the first bicuspid was still alive with organisms.

Undoubtedly there may be many men who will say there is nothing in this experiment, but it proves to the writer at least that he accomplished what he set out to do. When he follows the same routine in the mouth, he usually, though not always, obtains the same result. Results being all that count with him, he is satisfied.

CONCLUSION.

Ionization fulfils no purpose in this office.

Pulp Testing.

Some ten years ago or more, Dr. Prinz brought out a galvanic pulp tester, by means of which it was supposed to be possible to determine absolutely whether or not the pulp of a tooth was dead or alive, a much-needed device. Theoretically it certainly was fine, but in the writer's hands its use was not satisfactory, and so its employment was soon discontinued.

Quite recently, manufacturers have placed upon the market pulp testers to be operated upon the 110-volt current. Last fall, while visiting a friend in the East, one of these testers was shown to me by its enthusiastic owner, and after his very interesting dissertation upon it and its invaluable qualities, naturally a pulp tester was ordered.

Shortly after its receipt, a splendid opportunity for its use arose. A patient

* See *Dental Items of Interest,* August 1917, vol. xxxix, p. 561.

presented with every indication of an inflamed pulp. The dam was applied, the pulp tester connected up, and it gave a positive and unmistakable reaction, thus showing the pulp to be alive. A large inlay was then removed from the tooth, and a sharp bur was carefully driven right down into a putrescent pulp! A skiagraph was then taken, and typical light areas were shown about the root-ends.

The "enthusiastic friend" was given these details, whereupon he wrote as follows: "At a clinic all hands agreed that a certain tooth *appeared* to be devitalized. The pulp tester was applied, and it gave positive and unmistakable signs that the pulp was vital. A skiagraph was then taken, which showed that the roots were filled!"

Dr. Hermann Prinz now says that under certain conditions dead teeth can be *proved vital* by the electrical test.

In discussing this question with Dr. Thoma he said that it is possible for the nerve fibers in a pulp to be still vital shortly after the pulp has become putrescent.

Quite recently the writer was in conversation with one of the "stars" who tours the country, holding classes as he goes, along these lines. When it came to pulp testing, he had listed three methods: (1) Electrical. (2) Thermal. (3) Actual penetration.

He was asked, "Is the electrical test always positive?" He answered, "No." To the query, "Is the thermal test always positive?" he replied, "No." To the question, "Then in a final analysis the *only real way,* in this the year 1918, to tell whether or not a pulp is dead or alive is to drill into it?" the answer was "Yes."

And there you are!

Now, readers, as before stated, we are first, last, and all the time striving for results, and in this instance, not getting results, why go through all the motions of an electrical test if, after we have made the test, we are not sure that its result is positive?

At the beginning of the test we are in doubt. We know not whether the pulp is dying, dead, or alive. We make the test; it shows that the pulp is dead, and still we are not sure of it. Or it may show that the pulp is alive, and then we are not sure of that either, so what's the use? Such tests are not in our line, and they are no longer made.

CONCLUSION.

An up-to-date pulp tester *for sale!*

1237 MAISON BLANCHE.

Report of the Committee on Practice—Dental Society of the State of New York.

By PAUL R. STILLMAN, D.D.S., New York, N. Y.,
CHAIRMAN OF THE COMMITTEE.

(Read before the fiftieth anniversary meeting of the Dental Society of the State of New York, Saratoga Springs, June 13, 1918.)

IN reviewing the subject of practice, your committee is unable to report any epoch-making achievement or conspicuous advancement in dental science during the past year. There has been, however, a remarkable excellence in the current literature in dental science. This would seem to indicate a growing culture in professional work in marked contrast to that of a decade ago. The interest in postgraduate study is vigorous and widespread, and this interest extends practically to every department of dentistry.

Indicative of the professional interest shown in the problem of periodontal and periapical infections, is the fact that both the First and the Second districts of this society have given their entire attention to these subjects in the scientific programs of their meetings.

The pendulum of professional interest swings to extremes. Time was, and it seems but a short interval since, when the subjects of pyorrhea and the management of root-canal fillings brought but only a meager squad of regular attendants when these subjects were announced for discussion at society meetings. It was then the technique that was of particular interest. At the October meeting of the First District Dental Society not less than three hundred intensely interested members sat for two and one-half hours and listened while Dr. Frederick B. Noyes of Chicago discussed his slides, dozens of which were exhibited, showing the intimate forms and relations of the tissue cells of the teeth and their investing structures.

ROOT-CANAL TREATMENT.

Until very recently dentistry has failed to take cognizance of the importance of applied histology and pathology as revealed by photomicrography. The sadly meager preparation in these fundamentals which most of us received while preparing for our D.D.S. degree left us quite unprepared as to the basic principles underlying the demands of our present practice. So long as we confined ourselves to the filling of cavities of the teeth or the making of two-piece gold crowns, we were well within the range of our capabilities; but when we undertook the treatment of septic root-canals of teeth which had lost their blood and lymph supply through infections of the pulp; when we treated these conditions empirically, vacillating from one recommended nostrum to another and in vain hoping for success, a degree of knowledge was required which the average practitioner did not possess.

In retrospection of the past twenty years it is difficult to conceive of a more dangerous and unsurgical procedure than the sealing up of root-canals which contained dead animal tissue. The periapical infections which followed this practice are so universally believed at this time to be the foci of metastatic disease that mention here would seem almost superfluous. It would be just to call at-

tention to the fact that during the period of darkness through which we passed there were a few enlightened men in our profession whose practice and teaching will stand out prominently through posterity whenever this subject is discussed. These pioneers understood the pathologic significance of these infections even when their sequelæ were yet to be revealed. They did not then know that periapical infection by streptococcus viridans was productive of arthritis deformans, arterio-sclerosis, rheumatism, and the numerous other lesions which recent researches have disclosed. What is remarkable and most extraordinary is the fact that the pulpless teeth the roots of which were filled by these men more than half a score of years ago, were at that time conscientiously cleaned of the entire pulp contents and the canals filled, yes, even to and sometimes through the apex and encapsulating it—and this during a period when our colleges were teaching a technique of filling root-canals with cotton wool and iodoform. All honor to these great men.

The indictment of the dental profession for the practice of surgical crime in the treatment of root-canals is a matter of history.

Calling forth much attention in dentistry, and a decided step in advance of the accepted theories in general surgery, is the application of the principle of ionic sterilization.

To sterilize an infected tissue while it is yet within the body is an epoch-making procedure. Well may Medicine extend her interest in the science of dentistry, for have we not taught her that teeth are the sources of infection in many diseases in which she had been satisfied to treat the symptoms, for the reason that she did not know and would not believe there was anything else to treat? Modern dentistry has accomplished this, and offers abundant and convincing proof in hundreds of radiographic records of cases reported as evidence that a true sterilization of infectious periapical areas has been accomplished and bone regeneration excited by means of ionic medication.

Periapical infection from the surgical standpoint demands root resection and drainage, and while this is at times necessary, sterilization without drainage is an accomplished fact.

CONDUCTION ANESTHESIA.

The recent achievements of dentistry in conduction anesthesia of the head by the blocking of the ganglia of the fifth nerve have been so marked that this method of producing anesthesia has been adopted by the medical specialist in throat surgery. The infiltration of an infected tonsil hypodermically, a quite unsurgical procedure, has been practiced extensively. It may now be abandoned for it is possible to anesthetize a tonsil by nerve-blocking, and to carefully dissect it out with complete absence of pain. Dentistry is teaching medicine some things which must have a profound influence on surgical practice. Not only must the dentist radiograph the teeth and alveolar processes for his own diagnosis, but the surgeon must also have this information for the diagnosis of all cases of obscure metastatic origin, the diagnosis being made by the dentist.

U. S. ARMY DENTAL CORPS.

The organizing of the U. S. Army Dental Corps as one of the constituent parts of the medical department of the army under the supervision of the Surgeon-general of the army comes as a happy consummation of the fond hopes of our profession. Dentists have long felt that dentistry is and long has been an integral part of medicine. While it has been taught in separate schools because of the technical procedures which require special teaching and clinical requirements, its curriculum has expanded and advanced along with that of medicine.

The fundamental sciences which collectively compose the study of medicine are duplicated in the dental schools. The preparation of students in the best institutions of dentistry in such sciences as anatomy, physiology, chemistry, histol-

ogy, and general pathology are not surpassed by accepted medical schools. The requirements for dental matriculation and graduation have been brought up to the present-day standards which have been set by similar medical schools.

These facts, however, seem not to be the poignant reason for the present recognition which has been for so many years withheld. It has come through a widespread acceptance of the relative importance of the rôle which mouth infections play in the etiology of systemic diseases. It has been through the results of dental as well as medical research that the present intimate relation of medicine and dentistry has been brought about. During the past five years the attention of the whole world has been incessantly called to the results of dental science in the treatment of oral infections and their sequelæ. Infections of the eye, ear, nose, and throat, infections of the heart muscles, the joints, the whole gastro-enterologic tract, etc., have been correctly attributed to foci which are legally and otherwise within the exclusive field of dentistry. Cases in private practice, many of which have never been reported but which are in their importance no less impressive, have centered the attention of the whole world upon the importance of oral health and its application in medical prophylaxis. Couple these facts with the reports from the European hospitals that wounds of the face and fractures of the jaws compose twenty per cent. of all injuries which are brought in, and many of these complicated and prejudiced by the presence of septic teeth; the prevalence of "trench mouth," which is doubtless a type of ulcerative gingivitis—Vincent's fusiform bacillus infection, an infection of the gingiva which is the most devastating of all oral infections—and we may appreciate the importance of the rôle which the U. S. army dental corps is expected to assume.

TREATMENT OF INJURIES OF THE JAWS.

During the past year there have been shown at various medical and dental gatherings a large number and a great variety of lantern slides and even some motion pictures, detailing all sorts of jaw operations and methods of treating jaw cases. Slides have been exhibited which were made from photographs taken at the hospitals of the Central Powers as well as from those of the Allies. The notable and outstanding feature in connection with all these exhibits has been the marked contrast in the methods as well as the results obtained in cases where operation or treatment was supplemented by the use of orthodontic appliances, and those where other types were used. The orthodontic appliances as exhibited were very poorly selected, and their manner of adjustment indicated a lack of fine orthodontic technique which could not fail to impress an orthodontist with the crude management of these cases. In spite of this, the results in the cases which were treated by orthodontic methods were far superior to those in which any other method was employed.

The metal or vulcanite interdental splint or any other appliance which locks the jaws is dangerous to life, as well as being clumsy and unsanitary. The disadvantage of appliances of this type is practically illustrated by the case of nearly one hundred British soldiers who were being returned to England by a Channel boat. The men were all wearing in one form or another interdental splints. Seasickness, with its usual symptom of vomit, caused the death by strangulation of these wounded. This makes one inquire why the knowledge and skill of the specialists in orthodontia has not been mobilized by the medical corps of the army for the benefit of our own boys.

SPECIALIZATION IN DENTISTRY.

This is the era of the dental specialist. The ranks of general practice are being deserted daily. The busiest men in dentistry are quietly taking up special branches and delegating to associates those departments of general practice in which they recognize personal and professional weakness, or for which they

have an actual distaste. First it was exodontia. The extraction case was a nuisance in the office. The extraction specialist solicited this work, which was never profitable unless done in volume, and so all cases were thereafter referred to this specialist. Next it was orthodontia. Who has not heard the tales and seen the fearful and terrifying results of pre-Angle orthodontia—arches mutilated by the extraction of sound teeth? For at that time it was believed that the teeth were too large for the jaws. The general practitioner was glad to delegate this work to skilful hands when the necessity of normal occlusion was finally understood.

The specialist in prosthetic dentistry developed into a prosthodontist through his conspicuously superior skill. At first only those cases which had been classed as "probably impossible to fit" after an experience of several failures were referred to him. Previous to the perfecting of the anatomical articulator vulcanite dentures were the least profitable kind of practice. Vulcanizing was malodorous and plaster of Paris kept the office untidy. Crown and bridge work came in, and the vulcanizer was forced out of the laboratory.

The casting process of Taggart revolutionized both operative and prosthetic dentistry. In the last twenty years almost every method and principle of practice, except the cavity preparation of Black, has been abandoned for newer, more modern, and obviously better methods. The amalgam filling has burst its cocoon, and from that disgusting larva—the thumb-carved abortion of the late nineties—it has emerged into a beautiful butterfly, the carved, contoured, and burnished amalgam restoration of the present day.

The pyorrhea specialist has developed into a periodontist, choosing as an exclusive specialty the treatment of the several pathologic conditions which attack the investing tissues of the teeth.

There is also the radiodontist or dental roentgenologist. Soon there will be other specialties. Where will it all end? Is dentistry to disintegrate through this process of division and subdivision? Twenty-five years ago there were simply operative and mechanical dentistry and we all specialized in *both*. Today the conscientious dentist must spread himself out very thin, or realize that he has fallen down and is being buried under an avalanche of practical results of research and modern methods due to scientific investigation.

There is an ancient adage which says, "One swallow does not make a summer." In the light of the advancement which has been made in the practice of dentistry during the past few years may we not paraphrase, and say, "One graduate does not make a dentist?" Are we to believe that this beloved profession of ours has outgrown the man, or that the sporadic development of specialists in dentistry over the length and breadth of this continent has sounded the death knell of the general practitioner? The Middle West and the Pacific Coast have two specialists (to the percentage of population) to one in the East. Specialization is in the very air.

Every dentist who is worthy of the name and who still possesses the vigor of his manhood is making every effort and straining every fiber in an effort to adopt into his daily practice the conspicuous improvements that are at intervals being introduced; meanwhile the avalanche of excellent material is continuously descending upon him.

What of the public—the laity who compose the vast *clientèle* of dentists? Do these millions like the new era? Do they approve of being sent to this office for one operation and to that one for another? They do not. They are demanding service of every conceivable dental sort from the specialist, and they are being inconsistently refused. An efficiency engineer has expressed himself as follows:

> You specialists are making the greatest mistake of your professional history with your medieval methods of conducting your practices. You deny that their is competition, and yet you all compete. Are you more ethical than the banker or the engineer or the architect or the surgeon? You are not.

Certainly banking is a business and so is every professional occupation a business—when it is successful—and when it is not a business it is a business failure. This idea of being sent from one office to another, from one dentist to another, is absurd. Who would enjoy a banquet which served the soup in Washington Square and coffee on Washington Heights and the other courses all along the route? Did you ever hear of the Mayo brothers, the doctors of Rochester, Minn.? Are they ethical? Are they respected? Who is the president of the American Medical Association? Dr. Charles Mayo. Is he the best surgeon in the world? Probably not, but he and his brother are the most successful physicians in the world. They are serving the public better than any others in the world because they understand the modern idea of consolidation and co-operation. The trouble with you dentists is that you do not know the elements of economy nor the meaning of the word business. As a class you do not make one good investment of your savings in ten. You are notorious marks for the wild-cat-scheme promoter and the fake mine-stock salesman. If it takes six of you fellows to make one dentist, for God's sake consolidate and make one. Save the item of at least five office rents per year and distribute the sum among yourselves, and don't forget that you need a business associate to look after that department, for there isn't a single business man in your whole profession.

Can it be true that this is the opinion concerning dentistry which is held by others besides this efficiency enthusiast? Would it be possible, for instance, to group the four dentists in a village of, say 2500 population into a co-operative group with one common reception room and suite of offices, and to persuade the young teller of the local bank to become a business associate with an equal interest in the earnings with the other associates? Your committee does not presume to answer. It is possible to conduct a medical and surgical hospital wherever one can be supported. Why not a dental hospital?

This conversation is interpolated in this report to arouse discussion. It is submitted.

Those who have made the most conspicuous success of specialties have done so after some years which have been devoted to general practice. In other words, they have evolved in the natural way. The special field in which their talents and their tastes have developed gradually crowded the other branches of work out of the daily routine. A short course of postgraduate instruction to clear up some of the less understood or the more perplexing phases of their work, or some instruction by the side of a preceptor who had developed further in the specialty, sufficed at best to convert the general practitioner into a full blown specialist.

Now we have seen emerge the schools for the making of the dental neophyte into a dental specialist. Young men fresh from college who are still without the important and broadening experience of several years of successful practice are entering these institutions. The next step is the mailing of the familiar announcement which informs all who may receive it: "Practice limited, etc. Office hours 10.30 to 2."

The entering into specialization signifies a frankly acknowledged ability in some chosen special branch. When an announcement is backed by real ability plus experience, the world is better for the change perhaps, but when a specialist is announced whose only excuse is a greedy desire to profit at the expense of the profession and public and a desire for larger fees and shorter hours, every man in the profession is at once personally injured.

The time was, and in this state it was less than forty years ago, when anyone could practice dentistry if he could make the public believe he could. Our society put a stop to this, and had passed a dental law which protected both the dentist and the public. The day is not far distant when the law will be called upon to protect the public from and which will define the specialist. This committee respectfully recommends to our president and to the Legislative Committee that an investigation be made into the abuses of pseudo-specialists, and that suitable laws be submitted to the State Legislature which will define the specialist and authorize and license only those who are competent.

There is another danger, and that is to the specialist. The past president of the National Dental Association, Dr. L. L. Barber, in his address last year, had this to say:

> The danger of specialization is its narrowing influence. It is an extraordinary man who can continue upon a single objective without losing his sense of proportion. Brains, as farm lands, are enriched by diversification, and deteriorate when devoted too long to the same purpose. Efficient thinkers re-vitalize their minds with a variety of interests. Their intelligence remains symmetrical. When a subject especially appeals to you, beware lest you become so wrapped up in it that, like the silkworm, you shut yourself off from all the other wonderful things in view.
>
> Nevertheless, specialization has its advantages and no man is so large that he can comprehend to the fullest all the phases of any profession. But let us not specialize until we become too narrow between the eyes, and our horizon not farther away than the end of our nose.

Like the proverbial fat man, no one really loves a specialist. The long-suffering public patronize them when they feel that they can afford to do so, yet they never love them as they have loved the family dentist. They recommend them to their friends with the same enthusiasm, however, as the small boy, just emerging from the side show where he has just seen the seven-legged horse or the two-headed calf, recommends the show to his friends.

The dean of the graduate department of an important university once called a specialist, "One who knew so much more about one thing than he knew about everything else, that he thought he knew more about it than anyone else did." To which someone has ventured to add that "There also is the variety of specialist who is inclined to think that if he gives any thought to any other subject, he will know more about it than anyone else knows."

Your committee presents you with the specialist already in your midst, and in the classic interrogation made famous by the late Richard Croker, asks "What are you going to do about it?" So commendable is the thirst for knowledge and so desirable is its satisfaction that nobody should even dream of criticizing adversely the admirable ambition of those who act upon a stern determination to thoroughly prepare themselves to render service as one of our several recognized specialists. Those who have become recognized as specialists are doing all they can by means of special articles, lectures, private courses of instruction, etc., on the theories and practices of their several specialties, with a generous devotion and desire to help any brother practitioner in the achievement of a laudable ambition. Not every practitioner who enters upon a special course of postgraduate study does so for the express purpose of entering upon the practice of an exclusive specialty. Many enter these classes largely for the academic value and the broadening influence which special knowledge must necessarily have in the daily routine of office work. The broader the academic knowledge of dentistry in the field of the specialist, the greater becomes the difficulty for the man so educated to be satisfied to putter and plod along with methods and technique which he has previously employed, and which he has come to recognize as antiquated or obsolete. He recognizes his personal incapacity to excel or even compete with the superior skill of others who devote their whole professional life to work within definite, prescribed limits. He acknowledges to himself that all of us can no longer become successful specialists at once in every department of dentistry.

To possess the broad, academic knowledge which is expressed in a familiarity with the working principles of every department is an essential which all should possess. To be able to recognize and make correct diagnoses of conditions as they present, and to decide in the interest of the patient whether an operation and treatment should be personally undertaken or whether in conscience the work should be referred to another man of admitted superior experience and skill, is the province of every ethical postgraduate.

Take for instance the specialty of or-

thodontia. Not every dentist who has taken special postgraduate work in orthodontia feels free to accept each and every class of cases together with the responsibilities of general practice, and it is this type of man who generally becomes convinced that he must either refer all cases in this branch to a specialist or forsake the burden of general practice and devote his whole time to the study of this new science, which is recognized to be big enough to satisfy his ambitions. To be able to recognize malocclusion and to appreciate the imperative need for early treatment for those who are so afflicted does not demand a co-existing responsibility to personally treat these cases. To "tell time" one does not have to know much more about a watch or clock than that it needs periodical winding, and as a matter of fact, that is all anybody except the makers and repairers of watches and clocks do know about either. We can contentedly and safely leave such knowledge to specialists, and of necessity we take this attitude in regard to orthodontia, and thus, to be consistent, with all of the other branches of specialized science practical knowledge of which we may by chance fail to possess. The real crime is that one often leaves the work to the incompetent or ignores the necessity for treatment altogether, thus allowing patients to develop into dental cripples by shirking a responsibility either through ignorance or greedy avarice. It is not that one is not a specialist and skilled in the technical details of an exclusive specialty, it is that he fails in his duty to his patient, a duty which carries a greater responsibility year by year as our science develops.

115 Broadway.

[See also *Discussion*, as reported under "Proceedings of Societies," this issue.]

Physiological Age: The Relation of Dentition to Body Growth.

By LESLIE SPIER, New York, N. Y.,
AMERICAN MUSEUM OF NATURAL HISTORY, NEW YORK.

(Read before the Eastern Association of Graduates of the Angle School of Orthodontia, New York City, May 6, 1918.)

No hard and fast line can be drawn between the pathological and the normal. We recognize morbid cases of the extreme type easily, but on the other hand we all admit that normal individuals exhibit a certain amount of variation among themselves. Just where we are to draw the line between those we choose to call normal variants and those we call pathological really varies with the point of view of the moment. The orthodontist today corrects conditions which in our fathers' time were not considered sufficiently abnormal to warrant treatment. In other words, today we draw the line much closer to the normal.

When we reflect on this point we see that there can be no gap between the normal and the pathological; individuals grade by degrees from the normal to the extreme types. Now, this is the essential characteristic of all variable phenomena, and so inflexible is the rule that we find

that one simple type of expression fits any varying phenomenon. If we rank a company of soldiers according to stature, or arrange all the leaves of a tree by length, or whatever class of objects you choose, we always find that most of the individuals stand closest to the average, taller and shorter individuals are fewer in number, and extremely tall or extremely short individuals will hardly be found at all.

Curiously enough, if we toss a number of coins, say seven, the possible ways they can fall, counting only heads, are:

Heads.	Frequency.
0	1
1	7
2	21
3	35
4	35
5	21
6	7
7	1
	128

That is, in 128 trials we may expect the seven coins to give no heads once, one head seven times, two heads twenty-one times, etc. We are accustomed to say that the tossing of the coins is governed only by "chance" and that the resulting record represents "accidental" frequencies. The mathematician tells us that "chance" represents merely a multiplicity of factors operating at the same time on a class of objects which are free to be affected by causes producing variation. He would expect to find in a company of 128 soldiers that there was only one individual of the shortest stature, seven next taller, twenty-one next, etc.; that is, in regard to stature or any other characteristic, they would vary freely according to the "law of chance." So, too, we find that the morphology and physiology of the normal type varies in exactly the same way to such an extent that we are constrained to call the extreme variants pathological cases.

The human body is a delicate mechanism and subjected to the vicissitudes accompanying the growing period, and we may well expect accidental variations to be perpetuated in the adult form. Naturally the effect of these vicissitudes must be cumulative; diseases of infancy impair growth, later favorable nutrition may accelerate it, still later the child's growth may again be retarded by the development of morbid characters, and so on until the cumulative effect of these physiological disturbances is fixed in the adult form. The course of growth for a group of children may be conceptualized as similar to that of a group of balls rolling down a bowling alley. Let the balls be essentially identical, let them receive at the same instant the same initial impetus; now one meets an obstruction and lags, now another, then a third is accelerated by a smooth stretch, and so on; before long they have perceptibly scattered, and the longer the course they run the greater the degree of scattering will be. So a group of children show variations in the age at which they pass through particular physiological states; that is, as Professor Boas long ago explained, the variations in the period of development found in the group are due to accelerations and retardations of growth.

I have determined such variations in dental development of a group of 350 Porto Rican boys. The following figures give the average ages at which the deciduous teeth are shed and the variation in years of the occurrence of that process:*

* The mathematician has a convenient measure of the variation of a free variable in the "mean square variability," or simply the "variability." When he says that upper outer deciduous incisors are shed at 7.8 ± 1.6 years, he means that the average age was 7.8 years but that 34 per cent. of the boys shed the teeth between the ages of 7.8 and ($7.8 \pm 1.6 =$) 9.4 and another 34 per cent. shed them between ($7.8 \pm 1.6 =$) 6.2 and 7.8. The "variability," here 1.6, shows the degree of scattering of the bulk (68 per cent.) of the losses about the average. When the "variability" is small, then the mass stands close to the average; when it is large, the scattering is great.

TABLE I: LOSS OF THE DECIDUOUS TEETH.

	Outer incisors.	Canines.	First molars.	Second molars.
Upper	7.8 ± 1.6	9.5 ± 2.5	9.1 ± 1.9	10.3 ± 2.1
Lower	. . . .	8.4 ± 2.2	8.9 ± 2.2	9.2 ± 3.2

Similarly, the ages at which the permanent teeth are erupted and the variability are as follows:

TABLE II: ERUPTION OF THE PERMANENT TEETH.

	Inner incisors.	Outer incisors.	Canines.	First bicuspids.	Second bicuspids.	Second molars.
Upper	. . . .	8.5 ± 1.4	10.3 ± 2.2	9.2 ± 2.0	10.7 ± 2.0	12.1 ± 1.7
Lower	6.2 ± 1.5	7.0 ± 1.3	9.0 ± 2.3	9.9 ± 1.8	10.9 ± 2.0	11.4 ± 2.0

These periods of dental development are, of course, roughly true only for Porto Rican boys. We obtain other figures for girls, for other races, and for other social groups. For example, for Boston school children Channing and Wissler found the following values for the eruption of the upper permanent teeth:

TABLE III: BOSTON SCHOOL CHILDREN—ERUPTION OF UPPER PERMANENT TEETH.

	Inner incisors.	Outer incisors.	Canines.	First bicuspids.	Second bicuspids.	Second molars.
Boys	7.5 ± 1.4	9.5 ± 2.1	11.2 ± 1.4	9.4 ± 2.2	11.4 ± 2.9	13.2 ± 2.0
Girls	7.0 ± 1.6	8.9 ± 2.1	11.3 ± 1.0	9.5 ± 2.5	11.2 ± 2.9	12.8 ± 1.6

As these figures stand, the Porto Rican boys appear to erupt their teeth as much as a year in advance of the Boston boys. However, the meaning of this is obscure, since the same observers also found that a group of feeble-minded children erupted their canines and second molars a corresponding period in advance of these Boston boys. (See Table IV.)

These variations, which we find in the age at which children pass through the same physiological stage, must be regarded as due to accelerations and retardations brought about by the earlier vicissitudes they have suffered.

Since the stage of development of a child at any period depends on the previous acceleration or retardation of its growth, which must have affected the whole body in some measure, it follows that all measurements taken on that child must vary in the same direction from the average of the group; either all values must be increased beyond the average for its age by acceleration or all depressed by retardation. The interrelation

TABLE IV.

	Boys.	Girls.
Canines	10.7 ± 1.4	10.0 ± 1.7
Second molars .	10.9 ± 1.9	11.8 ± 0.9

of these measurements, which are indices of physiological development, varies with

the rate of growth. After birth the rate of growth declines until it reaches a minimum, in girls, at about 8.2 years, then it increases very rapidly until a maximum is reached at 11.2 years (these figures are 10.3 and 13.2 for boys), after which it again declines until growth ceases.

Let us imagine our figurative bowling alley built on a series of inclines to represent these conditions; first an incline upward, then a sharp down stretch, then a slightly rising plane to the end. When the group of balls reaches the first break they have already scattered somewhat. Those that are accelerated reach the declivity first, they shoot ahead leaving the retarded ones behind, and the scattering of the whole group is thus greatly increased. Now the accelerated reach the foot of the ascent, their speed is checked, the retarded catch up with them and the scattering is markedly reduced.

Leaving aside for a moment the effect of this on the group considered as a whole, we see that for any individual the more rapid the rate of growth the greater is the effect of variation in period on all his measurements. A retarded child will fall farther behind his age-mates at this time and fall behind in his entire development. We find that this has the effect of increasing the correlation between all measurements during the period of rapid growth and conversely decreasing it during the decline of growth.

Since, from our point of view, body measurements such as stature, weight, strength, etc., are indices of particular physiological developments for which we have no sure means of recognition, variation in period as expressed by a measurement must be the variation in period at which a particular physiological status is attained. We should therefore expect a correlation between such measurements and any recognizable physiological status, and further that this correlation would depend upon the rate of growth.

I have investigated the extent to which this holds for dentition and stature among the Porto Rican boys. If there is a correlation between dentition and stature, then at a certain age those individuals accelerated beyond the average dental stage of their age should show a greater average stature than the remaining individuals. For example, eight-year boys with permanent upper canines are more developed than their age-mates who lack these teeth; as accelerated individuals, the group with canines should have an average stature greater than that of the group without canines. Similarly, a group lacking deciduous canines should be taller than a group of the same age with these teeth.

Grouping the boys according as they have or have not a particular tooth, and finally taking all the teeth together (that is, weighing the stature of each individual according to his dental pattern), I found the following average statures and variabilities for the accelerated and the retarded groups:

Table V: Statures of Accelerated and Retarded Groups According to Dental Pattern.

Age.	Retarded group.	Accelerated group.
7	1142 ± 52	1146 ± 56
8	1179 ± 49	1178 ± 56
9	1247 ± 41	1259 ± 45
10	1259 ± 61	1282 ± 68
11	1286 ± 61	1315 ± 54
12	1348 ± 71	1384 ± 74
13	1303 ± 90	1394 ± 76

After the ninth year the average statures of the two groups differ, the absolute difference increasing to the fourteenth year. Thus, merely by this relatively rough test, separating the boys grossly according as teeth were present or not, we discover the close correlation between the physiological status as indicated by dentition and a body measurement like stature. A much more subtle statistical analysis could be made of this problem if we had metrical observations for the entire course of development of each tooth. To test these results I treated the data for Channing and Wissler's Bos-

ten school children in a similar way for both stature and weight, with confirmatory results, and the same results were obtained in an earlier investigation by Dr. Crampton.

Here we have a sample of the kind of physiological variation which occurs in dentition measured on the scale of stature. The scale of stature is that of the normal course of growth, represented by the average statures for the whole group of boys year by year. Transforming the statures for the retarded and accelerated groups into years (for example, we can interpolate the stature 1303 in a table of average statures and find 10.8 as the corresponding age), we obtain equivalent "physiological ages":

TABLE VI: PHYSIOLOGICAL AGE OF ACCELERATED AND RETARDED GROUPS.

Chronological age.	Physiological age.	
	Retarded group.	Accelerated group.
7	7.0	7.0
8	8.0	8.0
9	8.9	9.3
10	9.3	10.2
11	10.3	11.2
12	11.5	12.7
13	10.8	13.1

These figures give a clearer insight into the meaning of the differences found. Physiological development in dentition varies among these boys to such an extent that boys with retarded dentition and whose actual or chronological ages are 13 years are physiologically only 10.8 years of age!

"Physiological age" is therefore a surer expression of a child's development than his chronological age. Similar observations on the correlation between physiological status and body measurements—such as those of pubescence with stature, weight, strength, lung capacity, growth of the head and face, and mental development as indicated by school standing—made by Boas, Crampton, and Deaver, have emphasized the point that "physiological age" is more significant than actual age.

Do these extreme physiological variants represent abnormal types? Are we now in a position to draw a line between the normal variant and the pathological individual? At first blush it would appear that an individual who physiologically was only 10.8 years after having lived for 13 years must be a pathological type. But our first caution is that we know that had this individual's status been fixed by dentition alone, instead of by dentition and stature, he would probably have differed less from his agemates. This leads us to seek for the true meaning of physiological variation.

The illustration previously used of balls in a bowling alley showed us that the degree of scattering or variation from their average position depends on their speed: by analogy the variability among children depends on their rate of growth. At the beginning of the sharp declivity the previously accelerated balls shot ahead, their variability increasing beyond that of the lagging retarded balls. By the time the accelerated balls entered on the final rising stretch and slowed up with decreased variation, the retarded balls were on the declivity, and their scattering, in turn, was greater than that of the accelerated group.

So among the children at the beginning of the period of rapid increase in the rate of growth, the accelerated individuals must be growing at a higher rate than the retarded individuals of the same chronological age but who have not yet entered into the period of rapid growth. Conversely, at the end of the period of rapid growth the accelerated individuals must grow at a slower rate than the retarded. Consequently, at the beginning of the period, accelerated individuals must vary more than retarded individuals from the average of their age, and less at the end of the same period. We have compared below the variabilities of the retarded and accelerated groups of each age:

TABLE VII: VARIABILITIES OF THE ACCELERATED AND RETARDED GROUPS.

Age.	Retarded group.	Accelerated group.	Difference.
7	52	56	+ 4
8	49	56	+ 7
9	41	45	+ 4
10	61	68	+ 7
11	61	54	— 7
12	71	74	+ 3
13	90	76	—14

While the results are not marked, the accelerated group varies more than the retarded group at first, but the relations are reversed at the end of this period. Considering the group as a whole, this means that physiological variation is greatest for all the boys when the rate of growth is greatest, and least when the rate is at a minimum.

Since the amount of variation depends on the rate of growth, we must expect to find that a truly pathological individual stands much closer to the average of his age-group when growth is slight than when growth is great. In other words, if we are to draw a line between the pathological and the normal, the line must vary in position from year to year, being closer to the average during the years of minimum growth, and farther from the average, measuring on the same scale, during the years of maximum growth.

Next we may ask whether the extreme variants at a particular age remain extreme types throughout the course of their development. An answer to this question will determine whether we are to consider a particular case of extreme variation as pathological, or whether we can expect more or less complete recovery to normal type.

While it is true that a close correlation exists between the development of the various parts of the body, nevertheless all organs do not develop at the same rate, so that when one organ has reached a particular stage in its development another may exhibit a certain amount of variability. From this point of view, the increased variabilities in stature which we found in both accelerated and retarded groups may be an expression of a different rate of development from that of dentition, for if this is so, the greater the degree of acceleration or retardation of dental development the greater will be the variations in stature.

So it follows that what we have been calling the "physiological age," based on the stage of development of one particular organ, by no means represents the physiological development of the body as a whole. Nor can two individuals of the same "physiological age" be considered as physiologically identical, since they are identical in one characteristic only. Furthermore, and most important, chronological age cannot be left out of the reckoning. It is not the same thing whether an individual is "physiologically" 10.8 years old when he is only 9 years chronologically or when he is 13. In the first case, as an accelerated individual he represents a stimulated condition; in the other he represents the depressed physiology of the retarded.

If we trace the course of growth in stature, for example, we find that the boys who grow rapidly before the interval 14–15 years grow slowly later on, while those who grow slowly before that time later grow rapidly. If this were not so, we should find the accelerated individuals continuing to grow rapidly into giant types, while the retarded would grow up pigmies, whereas we find that the ultimate variation in the adult is relatively small. Still, this recovery toward the normal type does not take place in the same way in all individuals. For example, if one group of children attains a certain status in the development of some particular feature at 10 years, while another group attains the same status at 14 years, the former will take longer than the latter to attain the full development, the rates of growth proceeding in entirely different ways.

When acceleration of growth does begin late in life among the retarded, the whole energy is expended in a very short time, the rate of growth far exceeding that of normal individuals. But it seems

fairly clear that the recovery to normal type is not completed in this short period of rapid growth; excessively retarded individuals remain underdeveloped. Since the subsequent development of individuals of apparently the same physiological status proceeds variously, we cannot put a finger on the extreme variants at any particular age and say, "These are pathological," for while one may continue growth as an extreme type, another may later revert to normal condition. We can say, however, that an individual extremely retarded in late childhood is much more likely to be a true pathological type than one retarded early in childhood. Whether, conversely, early acceleration has a beneficial influence we are in no position to say.

These cautions, then, prevent us from discriminating the pathological from the normal on the basis of our data on dentition. As they stand, they are indicative but not of diagnostic value. Only by a more thorough study of dental development especially in relation with other body characters can such data be obtained.

I am tempted to utilize this opportunity to suggest what data orthodontists are now in a position to supply:

(1) Metrical observations on the course of growth of the teeth in the population at large from the first development of the germ to the final states in both deciduous and permanent dentition.

(2) Parallel observations on the same individuals of the other parts of the body, such as palate measurements, stature, weight, strength, pubescence, ossification, etc., for the purposes of correlation.

(3) Observations of the same sort on the selected group which comes to the orthodontist for treatment, to show the types of variation which are found among avowedly extreme cases. Further, similar observations to show what variations can be effected by the various corrective practices.

In all these observations care must be exercised to separate the data by age, sex, nationality or race, and economic conditions.

77TH ST. AND CENTRAL PARK WEST.

[See also *Discussion*, as reported under "Proceedings of Societies," this issue.]

Band of a Gold Crown in the Bronchus: Report of a Case.

By CHEVALIER JACKSON, M.D., and WILLIAM H. SPENCER, M.D.,
Philadelphia, Pa.

THE infrequency with which dental appliances and the smaller instruments are by accident aspirated into the bronchi is most remarkable, when we consider the number of cases treated yearly by the dentist. The following case is, however, of peculiar interest to the dental profession:

Case No. Fbdy 653 was brought from a western city with the history of aspirating the band of a gold crown, which had slipped from the grasp of the dental operator. Some slight coughing immediately followed, but there was no dyspnea. Later in the evening the patient had a severe attack of coughing and expectorated a small amount of blood. Radiographs made on the evening of the day of the accident showed the presence of the gold band in the right main bronchus. The situation was considered an emergency, and an able surgeon made an attempt at removal by oral bronchoscopy in the sitting position, under local an-

esthesia. The introduction of the bronchoscope was rendered difficult by the short neck of the patient, and the entire operation consumed six hours. The surgeon was able to grasp the foreign body, but on attempting its withdrawal it slipped from the forceps grasp and entered the left bronchus, from which he was unable to remove it. The patient was taken to a hospital, where he remained one week. Great swelling of the neck tissues and tongue, marked dyspha-

Fig. 1.

Radiograph of the band of a gold crown in the left bronchus. Lateral view.

gia and odynphagia followed, and the temperature rose to 101.8° F. Patient suffered from frequent coughing attacks, and the voice became very husky, although there occurred no alarming dyspnea.

The patient arrived at Jefferson Hospital on the eleventh day following the accident, the tenth following the unsuccessful bronchoscopy. Condition on admission:

Eyes. Pupils equal. React to light and accommodation. No imbalance.

Throat. Tongue much swollen and motility greatly impaired. Pharynx injected.

Larynx. Intense laryngitis with the presence of exudate and granulation tissue. Motility of the arytenoids much impaired.

Neck. Considerable swelling of the cervical tissues. Few enlarged lymph glands. Thyroid not enlarged.

Thorax. Well formed. Rounded. Walls thick and muscular.

Lungs. Expansion somewhat limited over the upper left front. Percussion note impaired over the upper right and lower left fronts. Breath sounds blowing over the upper right front and in the left axilla. Vocal fremitus and vocal resonance seem unchanged. No râles or friction heard.

Heart. Area of dulness normal. Sounds clear and regular. No murmur, shock, or thrill.

The radiographic report of Dr. David R. Bowen reads as follows:

> There is a metallic foreign body in the left lung, I believe at the bifurcation of the lower branch of the left bronchus. This is slightly in front of the anterior plane of the vertebral bodies. There is distinct evidence of considerable pathology in the right lung, particularly in the distribution of the lower bronchial branch, but hardly less marked in the distribution of the middle branch. There is very little evidence of any similar condition of the left lung. (See Fig. 1.)

Per-oral bronchoscopy in Jefferson Hospital with local anesthesia revealed an intense laryngitis and tracheitis with exudate and granulation tissue. The band (Fig. 2) was found embedded in the left lower lobe bronchus, at the orifice of the posterior branch, and was removed in one minute and forty-nine seconds. The patient experienced no discomfort and no rise of temperature following the bronchoscopy, and left for his home on the following day.

Fig. 2.

Band of a gold crown removed from the left bronchus.

COMMENT.

The possibility of the aspiration of dental materials into the bronchi, in spite of the infrequency of its occurrence, should always be remembered. It should never be assumed that the foreign body has entered the alimentary tract until a radiograph has proved the fact. Of more particular interest to the medical profession, perhaps, is the view taken with regard to the danger of the presence of the foreign body in the bronchus. From our extensive study of these cases the fact has evolved that if the stay of the intruder is prolonged for weeks or months, suppurative processes are set up in that portion of the lung distal to the foreign body. Signs and symptoms simulating with exactness those of pulmonary tuberculosis develop, and if the foreign body be not removed, a fatal ultimate result is almost certain. Certain organic substances set up a very active and violent inflammation of the bronchi and adjacent lung tissue in a very short time, often immediately after their aspiration, but the above-mentioned course of symptoms is the usual one taken in metallic foreign body cases. The pathologic lung changes are caused partly by interference with drainage of the parts below, and partly by the abrasions and the lessened resistance to infection

produced by the constant irritation of the foreign body.

The entrance of a foreign body into the bronchus should, however, not be considered an emergency, justifying hurried and insufficiently prepared attempts at removal. Time should be taken for accurate radiographic localization, and in addition to this a complete instrumental armamentarium with a trained corps of assistants is necessary for the successful, safe, and expeditious removal of foreign bodies.

1830 South Rittenhouse Square.

Trichlorid of Iodin in Dentistry.

By MILTON J. WAAS, D.D.S., Camden, N. J.

FOR some time the trend of modern antiseptics has been toward the halogen group as proving the most efficient. Particularly since the beginning of the war has this been the case, great progress in war surgery having been made, due largely to the use of the Dakin solutions by the Carrel method. The Dakin solutions are, of course, essentially modified chlorin solutions.

ANTISEPTICS OF THE HALOGEN GROUP.

Antiseptics of the halogen group are germicidal in inverse ratio to their atomic weights. Fluorin cannot be kept in solution, and is moreover extremely caustic to soft tissues. Chlorin is the most efficient of the group, but it is difficult to keep in solution without deterioration in strength. Bromin also has disadvantages which are difficult to overcome. Iodin has been probably even more widely used than any other of the halogen group. It is conceivable, therefore, that a combination of chlorin and iodin would produce the ideal antiseptic. This we have in trichlorid of iodin.*

CHEMICAL PROPERTIES OF TRICHLORID OF IODIN.

Trichlorid of iodin (ICl_3) is, as the name indicates, an atomic compound of chlorin and iodin having three atoms of chlorin to one of iodin. It is a heavy reddish brown fuming powder, acid in reaction.* It comes in hermetically sealed ounce glass vials, and is freely soluble in water. That it may be used in aqueous solutions is very important, as all antiseptics are most efficient when used in aqueous solutions. Being an atomic compound, it is, moreover, highly ionized in solution and therefore in a most active form.

PREPARING THE SOLUTION.

Certain precautions must be observed in preparing the solution. After making a small opening in the glass vial and weighing out the required amount of powder, the vial must be immediately resealed. This may be very satisfactorily accomplished by melting over the opening a small quantity of paraffin wax. This is necessary because the ICl_3 powder is deliquescent and it is much better to keep it in its original form. No metal should be used or touched in weighing out the trichlorid of iodin, as it attacks most metals energetically and is thereby rendered worthless for further use. As it will also attack the metal of the scales, it is necessary to first accurately balance on the scales a glass-stoppered bottle;

* See *Dental Items of Interest*, March 1918, for test tables of this anesthetic.

* Obtainable from Merck & Co., New York City.

the powder is then dropped from the original vial into this bottle, with the stopper inserted, and weighed. As it is an atomic compound, the solution will disintegrate if not prepared with *distilled* water. The stronger solutions from 1 per cent. up seem to keep for a long time without disintegration. The 1 : 1000 solution, however, should not be kept too long. The three solutions which will be found of greatest use in dentistry are the 25 per cent., 1 per cent., and 1 : 1000.

DISSOLVING BROKEN-OFF STEEL INSTRUMENTS.

The 25 per cent. aqueous solution is used for the purpose of dissolving broken-off steel instruments of any sort which may be found in root-canals and which cannot be dislodged by mechanical means. Only tantalum- or platinum-pointed instruments or a platinum-pointed dropper or syringe should be used in applying the solution. The action of ICl_3 when it comes in contact with steel or iron is to form ferrous iodid and ferrous chlorid, both of which salts are soluble in water. Its action is definite and very rapid if sufficient surface of the metal is exposed, and may be tested by dropping a broach in a little of the solution. In a canal, however, it has only the cross section of the broken metal to attack and it will often require more than one visit and patient technique to either reduce, say, a broken broach sufficiently in circumference so that it will drop out of the canal, or to entirely dissolve it.

Therefore it is necessary to drill around the exposed end as much as is safe, so as to expose as much metallic surface to attack as possible. Apply a small quantity of the 25 per cent. solution of trichlorid of iodin around the broach in the canal and allow it to remain for three minutes. Absorb this with paper points, wash out with distilled water and dry around the broach with cotton wound on a broach, removing any remaining ferrous coating. Dry with air-blast and pick around the instrument with Rhein picks. Apply ICl_3 again for three minutes; absorb, wash, dry, pick and enlarge the space around the instrument again, and repeat until the entire obstacle is removed.

PRECAUTIONS IN USING THE TWENTY-FIVE PER CENT. SOLUTION.

If the tooth under treatment is an anterior tooth, where any discoloration must be avoided, the best procedure is to flow a small quantity of melted paraffin over the dentin which lines the labial enamel—in other words, the labial coronal dentin. This will not interfere with the action of the ICl_3 in the canal, and the crown of the tooth will not be stained. In posterior teeth, if there is any reason to remove the stain, it can be best accomplished by applying a strong aqueous solution of ammonia followed by a saturated aqueous solution of sodium hyposulfite.

In 25 per cent. solution, ICl_3 penetrates the dentinal tubules rapidly and deeply, and is one of the most potent germicides known. It is, however, in such strength, quite caustic to the soft tissues, and must not be allowed to pass beyond the apex.

USES OF THE ONE PER CENT. SOLUTION.

A 1 per cent. solution, therefore, is the one of choice for use where the preparation will come in contact with soft tissue —to which, in this strength, it is not caustic and still is a remarkably effective germicide, containing almost the same percentage of available chlorin as the Dakin sodium hypochlorite solution. This solution has been found to destroy all tested mouth bacteria, including the streptococcus, in fifteen seconds. Whether it works quicker than this the writer does not know, as that was as rapid as the test tubes could be properly manipulated.

Used in an all-glass syringe with a platinum point, such as the Sausser irrigator, it is very valuable for washing out root-canals, fistulous tracts, sockets after extraction, cavities left after apicoectomy operations, and pyorrheal pockets. It will effect an almost immediate surface

sterilization. Being a highly ionized compound, it delivers up its available chlorin and iodin to the tissues at once. While its action when injected via an open root-canal into a granuloma or cystic cavity should be valuable, it would have to be repeated frequently to be sufficient to cure such a condition. To seal such a solution in a tooth as a dressing would be valueless, as its strength would be dissipated immediately.

SOLUBILITY IN CHLORCOSANE.

To those who, for any reason whatever, are not using "ionization" for this purpose, it might be interesting to know that I have found ICl_3 soluble in chlorcosane. Chlorcosane is Dakin's new single solvent for dichloramin-T, and is quite generally on the market. It is paraffin made liquid by having chlorin forced into it to the point of saturation. Most of the coal-tar compounds are quite permanent and give a bland solvent for chlorin-containing substances. Most other solvents readily take up chlorin and so destroy the effectiveness of the final solution. The chlorin in the chlorcosane itself has entered into permanent combination and has no action on tissue, as its chlorin is not available. ICl_3 in solution in chlorcosane might prove valuable to seal in an infected root-canal as a dressing, as in such an oily solution its available chlorin and iodin are but slowly given off and would act over some period of time. The writer has used this preparation with satisfaction, but only in a few emergency cases, relying on ionization in routine canal work, and, as before mentioned, it is offered as a suggestion for trial to those who have not adopted the former method. It is also worthy of note that ICl_3 is amœbicidal as well as germicidal when used in pyorrheal pockets. Painted on the mucous membrane it will give a sterile surface for the introduction of a hypodermic needle without having the caustic effect of tincture of iodin.

USES OF THE ONE-TO-ONE-THOUSAND SOLUTION.

In the 1 : 1000 solution, with the addition of saccharin to improve the taste, it is by far the most efficient germicidal mouthwash ever used. Used before and during the curetment in pyorrheal treatment and for a period of one or two weeks after, or until the acute inflammation and infection is controlled, it will be found of the greatest assistance. Even those who have heretofore been skeptical of the value of mouthwashes will be convinced of its aid if it is employed a few times. The solution should be freshly made and used warm every two hours, if possible. It will also be found valuable as a gargle in infected throat and tonsillar conditions. It is somewhat acid in reaction, and on this account its use should not be continued indefinitely, but it can be safely used for the time mentioned.

315 S. Fifth st.

Care of Children's Teeth.

By H. ANHAEUSSER, D.D.S., Peking, China.

PERMIT me to submit a few thoughts concerning the treatment of children's teeth and the care of the child during operation which I consider very important, and which are not often brought out in dental magazines.

I found children quite a trial to me in my early days of practice, and the experience I had with them and my present procedure may be of value to someone else working under similar circumstances. My personal recollection of visiting the dentist, as a small boy, is still very fresh in my memory, and will remain there until my last day. I was taken to a dentist whom I considered as an unfit person for his vocation, and only by brutal force was he able to complete the operation he was to perform. The same man never operated on me afterward; the fear instiled in me at that time was too great to be overcome even in after years.

Our little patients need more care and forethought than our older ones. A certain amount of confidence must be obtained before we can even begin with the operation; the child's trust must be obtained, and this can only be done very slowly, so that he will not be conscious of it or realize the object. To attain this, I have made it a rule to have the small patient prior to the treatment brought to the office to see me several times either by one of the parents or the nurse while out for their walk. A casual conversation of short duration is indulged in, and after a few days this is repeated, until the child is gradually shown into the operating-room. If time permits the chair is explained to him, or possibly the engine, until the fear of the office has passed, and an enthusiasm is worked up in the little one so that he feels eager to undergo the same operations as the older ones and does so without giving the operator any difficulty whatever in performing some of the most intricate operations performable on the rising generation.

This practice prevails in cases where there is nothing urgent—where only a thorough examination, with possibly one or two little cavities to be filled, is required. In cases where a severe form of odontalgia is present and requires immediate attention to alleviate the pain, I use a sedative at the first visit, and allow the patient to come back later on for the final operation.

Abscesses to be opened at the first sitting have been a great problem to me for some time, and caused a lot of annoyance until I used a method which I found to be excellent, not only with the little ones, but also with those more advanced in years who still have a fear of dental instruments.

I first examine the case without any instruments in sight. Then I select the instruments wanted for that particular operation, not allowing the patient to see anything that has been selected, and give them to my assistant for sterilization. Each instrument is brought in wrapped in a piece of cotton to conceal its identity as to the point, only the handle being exposed. The knife has the cotton wrapped about it very loosely, so that it has the appearance of an ordinary swab used for throat cases. Before it comes to me the assistant has worked this cotton sheath back and forth once or twice, to insure proper working, and to avoid any interference when I have to use it.

From all instruments I am to use the

cotton wrappings are removed as required in their proper order. From the concealed knife, however, the "camouflage" cover is not removed. This is introduced and its cover removed within the mouth by means of the index finger, pulling the cotton toward me, which leaves the blade of the knife free for working. So far I have had no difficulty whatever with my little patients, as by the time they begin to realize what has happened, the operation is over, and invariably so much relief is experienced that the thought of what really has happened to them is expelled from their minds. A pleasant conversation is immediately indulged in; I think almost everyone in the profession has plenty of such in store to expedite the discharge of the patient for that day's sitting.

As an anesthetic in these cases I generally use a small pellet of cotton dipped in carbolic acid, and applied until I have the spot where I intend to make the incision well under the anesthetic effect. Anesthetics which require a certain amount of preparation I do not use for these cases, as it means too much of a nervous strain for the patient, and makes the final operation very difficult. I have noticed when I formerly resorted to more active anesthetics that it was almost impossible for me to use them, and by the time my little patient was willing and submissive the anesthetic had lost its virtue, and the effort I had spent only resulted in making the child very nervous and setting for myself a more difficult task. There was also a great loss of valuable time, which means nothing to a child, and at the end I was unfit to go on with another patient. In our nerve-racking vocation a good deal of thought should be given to regulating our procedure in such a manner that we not only do justice to our clients, but also consider ourselves a little, and especially our *nerves*.

TREATMENT OF SMALL CAVITIES.

In treating small cavities where the decay has just penetrated the enamel, I resort to the application of a solution of nitrate of silver. I never use the lunar caustic stick in the mouth direct, for the simple reason that the mouth in cases of this sort is so bathed in saliva that it is impossible to keep the saliva from flowing into the cavity, and the final result will be that the whole mucous membrane of the mouth will bear evidence of the presence of $AgNo_3$—a very undesirable result. I use a small pellet of cotton between the beaks of a pair of tweezers—especially kept for that purpose and for the use of other escharotic drugs—moistened with water, then rubbed across the caustic stick until fully saturated. This I carry to the cavity and swab it out thoroughly, repeating this procedure two or three times until the desired result is obtained, each time using a fresh piece of cotton. Should this be considered sufficient, the patient is discharged. A record of the case is made, put on file, and at the end of three months the small patient returns for observation.

TREATMENT OF CAVITIES WITH PARTIAL DESTRUCTION OF DENTIN.

If I find that the decay has been progressive, irrespective of the former precautions taken, and has penetrated the dentin, I again resort to the $AgNo_3$, which in its action closes all the dentinal tubules, when all or most of the decay can be removed without any appreciable pain to the individual (I refer to deciduous teeth), by means of a sharp excavator. Repeat the application if necessary. By means of chisels, trim the margins, and fill with any suitable material. Allow yourself plenty of time and give the patient a sufficient amount of rest between each step to avoid tiring him.

PULP EXPOSURE.

The majority of our cases not under regular treatment and observation are most in need of our services at a time when pulp exposure has already taken place, due in many instances to lack of observation by the parent. I have also found many cases in which delay in treatment has been advised by their fam-

ily physician—of the old school, which still labors under the impression that children's teeth require no attention with the exception of having them *pulled* if any decay is present or discomfort of any sort arises.

If the case is such that the pulp is completely destroyed, the case is simple to treat, and I proceed as follows: With lukewarm water, the cavity is gently flushed out to clear it of all débris. With a very dull excavator I remove the adherent particles clinging to the sides of the cavity, and again flush until the cavity is thoroughly clean and the field is clear for good observation and exploration to ascertain if any vital part of the pulp is still present. Should this be the case, I fill the respective root-canals with either carbolic acid or creasote on a small pledget of cotton, and seal the whole with a temporary stopping, making it smooth with a small amount of chloroform. After two or three of these treatments the remaining vital portion of the pulp will be in such a condition that it can be removed without any pain whatever. Too much care as to the absolute and total removal of the smallest particle of pulp is not necessary. It is more important to see that the cavity is clean, and kept so during the operation and filling.

My next step is to fill the root-canals with a substance which can be absorbed with the rest of the tissues during the physiological process of eruption of the new tooth, and at the same time contain some disinfectant to avoid recurrence of infection. By means of a small probe I insert a small amount of aromatic iodoform paste, and carry it down as deep as possible without producing pain; then I use the ordinary base-plate paraffin wax to complete the filling of the root-canal. Over this is placed a layer of cement, after which the regular filling material is inserted to complete the operation.

EXTRACTION.

One of the most difficult operations to undertake in our practice with little patients is the extraction of their teeth, especially when the permanent teeth erupt irregularly.

Most of these extractions can be done with very little anesthesia. I also find it much better not to have the mother accompany the child whenever the extraction is to take place, as the child will be braver and much easier to handle. The small deciduous tooth forceps are so ingeniously made that under ordinary circumstances they can be well concealed within the palm of the hand, and be ready for use at the proper time.

FILLING MATERIAL.

As to filling material for children's teeth, I use alloy, cement, and gutta-percha. Each has its place, and whenever judiciously used satisfactory results will be obtained from either. The theory taught during college days, namely, that gutta-percha was the only material to use in children's teeth, I have long forgotten. I found it inadequate in some of the cases, and advantageous in others.

In teeth where a portion of the crown has been destroyed due to existing caries, and its adjacent neighbor encroaches upon the space, gutta-percha should be used until the proper alignment is restored. The gutta-percha filling should then be taken out and alloy substituted. One great fault I find with gutta-percha when used as filling material in approximal cavities is that it is often forced against the gum and produces an irritation; this can be avoided by using a metal filling.

I use cements in small cavities on the buccal or occlusal surfaces. The cavities can be easily kept under observation in case the cement washes out.

I *never* use cement in any cavity extending to the gingival line, either in children or in adults. In each case the filling will be found in excellent condition at the occlusal surface, and partially or totally washed out at the gingival border. I have never seen it fail to do this.

Root Amputation:

Being the Report of the Correspondent, Dental Society of the State of New York.

By ARTHUR W. SMITH, D.D.S., Rochester, N. Y.

(Read before the fiftieth anniversary meeting of the society, Saratoga Springs, June 13, 1918.)

THE subject of root amputation was selected for the Correspondent's Report this year because it has a close relation to two branches of the profession which are receiving constantly increasing attention at the present time—focal infection and oral surgery.

A letter and list of questions were sent to 52 general practitioners and oral surgeons throughout the country. Eighteen complete and ten partial replies were received from men in all parts of the country. To avoid repetitions and excessive length only a general summary, and a few quotations will be given.

It is interesting to note that a rather wide diversity of opinion exists on certain phases of the subject. Even the technical name for the operation seems debatable. Several good authorities, including Ottolengui, Kells, and Silverman, use the term apicoectomy, while Blum, Rhein, Burridge, and others are using the contracted form apiectomy.

QUESTIONS.

(1) Do you consider root amputation advisable in any case?

(2) *A.* In what cases or conditions?
B. On what teeth (anatomically)?

(3) *A.* What do you consider the best filling to use in a root-canal previous to amputation?
B. Why?

(4) *A.* In what percentage of your cases have you had a normal regeneration of the bone following the operation?
B (the reverse of *A*). In what percentage has the apical area failed to recover?
C. To what do you attribute these failures?

(5) Do you advocate the use of (A) the bur, (B) the chisel, or (C) both the bur and chisel for removing the root apex?

(6) If you radiograph the tooth at intervals after the operation, what have you found to be the average time (in months) in which bone regeneration has taken place?

(7) *A.* Do you consider it advisable to suture the incision after operation?
B. If so, what are the advantages?
C. If not, what have you found are the objections?

(8) *A.* Should the operation be performed by the general practitioner or by a specialist?
B. Why?

SUMMARY OF ANSWERS.

QUESTION 1—*Do you consider the root amputation advisable in any case?*

"Yes," answered by 14. "Occasionally," answered by 1. "In rare cases," answered by 1. "No," answered by 2.

The last two are quoted in their entirety.

(Quotations from answers.)

April 17, 1918.

My dear Dr. Smith,—Replying to your favor of the 10th, would say that I have not practiced "apicoectomy" for twenty-five or thirty years, and naturally what I did that long ago doesn't count.

The reason I discontinued the operation was because of its unsatisfactory results. The reason I have not taken it up recently,

since it has become a fad, is because I could not do it in a manner to satisfy myself.

I have seen a number of *very prominent* clinicians perform it, and not one have I seen whose work I would care to duplicate. Every now and then a case comes in having been operated upon by some prominent man in the North, and every single case so far seen has been unsatisfactory.

During all these years I have practiced replanting, which I can do satisfactorily. Possibly some of these days I will "catch on" to some trick by which I can apiectomize teeth to my own satsfaction, and then I will switch over to apicoectomy.

In an early issue of the COSMOS I will have a paper treating this subject, which I hope you will read, and I would appreciate your criticism of it.

Yours very cordially,

C. EDMUND KELLS.

April 22, 1918.

My dear Doctor,—As I am no longer a believer in apiectomy I do not think it is necessary for me to answer your questions, but I shall endeavor to state very briefly why I believe these operations are a failure. In my opinion the percentage of successful cases of root amputations is extremely small. I question very much if there is ever a normal regeneration of bone following these operations; at least I am convinced from the investigations I have made that an attachment of tissue to the root-end never takes place, which is, I believe, the chief cause for the failures. I do not regard radiographs as being conclusive evidence, as it is not possible to disclose minute changes or disease tissue that may exist, neither is it possible to determine by a radiograph if there is a regeneration of bone in the rarefied area or if dense bone around the rarefied area has resulted from the activity of the osteoblasts in the deposit of osseous tissue in the cancellous portion of the bone. These results can be produced by the stimulating of the osteoblasts by the use of certain remedies.

Trusting this will explain my position regarding the question, and answer your inquiry, I am

Yours very truly,

CARL J. GROVE.

QUESTION 2 (*A*)—*In what cases or conditions?*

(Quotations from answers.)

Major Robert H. Ivy: "Teeth showing areas of periapical bone destruction with granuloma, suppuration, or cyst formation where not more than the apical third of the root is involved, and where the general health of the patient does not demand more certain and rapid elimination of the focus of infection."

M. L. Rhein: "In such teeth where, after filling the root-canals, it has been found that encapsulation of the periapical ends of the roots has not been attained; in such cases of old infections where the ends of the roots themselves are necrosed; where a broach or other broken instrument may protrude through the end of the root; where some abnormality has produced nerve pressure at the end of the root; other conditions that may present pathologic features that have not been able to be remedied by correct root-filling."

(*B*)—*On what teeth (anatomically)?*

A great diversity of opinion seems to exist here. All were agreed on the six upper anterior teeth.

(Quotations from answers.)

Earl Brooks: "The ten upper anteriors."

C. H. Oakman: "All single-rooted teeth."

A. M. Nodine: "This operation may be performed on the following teeth, depending upon accessibility, anatomical considerations, and the experience and skill of the operator: About in the order of difficulty of operation and frequency, upper and lower centrals, laterals and cuspids; lower first molars, upper bicuspids, lower bicuspids, upper first molars, lower second molars, and upper second molars."

Theodor Blum expressed the opinion of the majority, however. He said:

"Apiectomy can be performed on all teeth if the apical area is accessible. Ordinarily, only the teeth up to and including the second bicuspids are considered."

QUESTION 3 (*A*)—*What do you consider the best filling to use in a root-canal previous to amputation?*

Four stated the Callahan method. One specified gutta-percha and chloro-percha, one gutta-percha and eucalypta-percha, and one oxid of zinc cement. Seven said "Gutta-percha," implying the use of either chloroform and rosin, chloro-percha, or eucapercha as the solvent.

(*B*)—*Why?*

The majority answered that it hermetically seals the tubuli and foramina.

(Quotations from answers.)

Dr. Oakman: "Habit, I presume; never used anything else."

Dr. Nodine: "(1) It is congenial to the tissues. (2) It shows clearly in the X-ray. (3) It may be made to fill the root-canal perfectly. (4) It shows at the point of cleavage and acts as a guide when the root-end is separated from the larger part of the root."

QUESTION 4 (*A*)—*In what percentage of your cases have you had a normal regeneration of the bone following the operation?*

(*B*) (the reverse of this)—*In what percentage has the apical area failed to recover?*

Here the replies were necessarily vague and inaccurate, but the questions were asked for the purpose of obtaining some idea of the number of successes or failures one might expect.

Estimations of successful cases varied from 98 per cent. as recorded by Blum, 95 per cent. by Thoma, 90 to 95 per cent. by Furnas, 90 per cent. by Brooks and Nodine, 75 per cent. by Rhein and Ivy, 60 per cent. by Moorehead, down to practically zero by Kells and Grove.

(*C*)—*To what do you attribute these failures?*

(Quotations from answers.)

Dr. Furnas: "Bad technique."

Dr. Percy Howe: "Lack of vitality in peridentum."

Dr. Blum: "First, operating on badly filled roots (reinfection), and second, using the chisel for removing the apex (root was split and had to be removed about a year later)."

Dr. Brooks: "Reinfection either from root-end or hematogenously, usually the former."

Dr. Moorehead: "Failure may be attributed to faulty technique, both in the operation and more especially, I believe, in the management of the root-canal. The regenerative capacity of the patient is a large factor."

Dr. Oakman: "In trying to do too much, or endeavoring to save teeth which should be extracted."

QUESTION 5—*Do you advocate the use of* (A) *the bur* (B) *the chisel, or* (C) *both the bur and chisel for removing the root apex?*

Ten advocated the use of the bur only. Four advocated the use of both the bur and chisel. One (Dr. Silverman) advocated the chisel alone.

QUESTION 6—*If you radiograph the tooth at intervals after the operation what have you found to be the average time (in months) in which bone regeneration has taken place?*

The average time given was six months. The minimum three months. The maximum fourteen months.

QUESTION 7 (*A*)—*Do you consider it advisable to suture the incision after operation?*

Twelve answered "Yes." Five answered "No."

(*B*)—*If so, what are the advantages?*

(Quotations from answers.)

Dr. Blum: "Shorter period of treatment; less pain."

Dr. Moorehead: "The immediate closure of the wound lessens the amount of scar tissue and insures a better contour. Where immediate closure is practiced, however, it is necessary at times to irrigate with a sterile normal salt solution. We have practiced both methods, and find that immediate wound closure in our hands is the more satisfactory method."

Dr. Rhein: "This is done to obtain healing by first intention. The same object can be obtained by placing an antiseptic dressing over the mouth of the wound, which will exclude oral secretion until protoplasmic cells have formed over the entrance of the wound. This method has a decided advantage over suturing, and accomplishes the same purpose. I believe it is original with myself and is not generally understood. The operation is a much simpler one than generally expected, and any competent general practitioner should be capable of performing the same."

(*C*)—*If not, what have you found are the objections?*

(Quotations from answers.)

Dr. Howe: "Unnecessary surgery."

Dr. Moffitt: "Suturing interferes with handling of gauze in inducing healing from within outward. For a single root only a small incision is necessary."

QUESTION 8 (*A*)—*Should the operation be performed by the general practitioner or by a specialist?*

Here again was a marked divergence of opinion. Seven answered, "By the specialist." Four answered, "By the general practitioner." Three answered, "By either."

(*B*)—*Why?*

(Quotations from answers.)

Dr. Moorehead: "Any form of surgery had better be done by a qualified surgeon. The general practitioner of dentistry is quite as competent to do oral surgery as the general practitioner of medicine is competent to do general surgery, but the individual who is giving his thought and attention to surgery, and is living in the atmosphere all the time, all things being equal, is more likely to get satisfactory results than the individual who is giving almost all of his time and thought to general practice."

Major Ivy: "The operation should only be employed by the surgical specialist, because he is accustomed to operating under aseptic conditions essential for the best results, and is better prepared to handle the cases. The technical requirements of the operation demand experience in this work gained only by constant practice."

Dr. Furnas: "The day is coming when the general practitioner will do this work, but now there is a big question of technique, ability, and *equipment* involved."

Dr. Nodine: "It may be performed by the general practitioner provided he has the equipment, experience, and skill, and is careful and thorough in his work and does not attempt hopeless cases. Unless he possesses these requirements or qualifications it had better be left to the specialist."

Dr. Howe: "Simple thing; any dentist can do it."

GENERAL CONCLUSIONS.

There seems to be good authority for employing either the term "apicoectomy" or "apiectomy" in speaking of the operation of amputating the root of a tooth.

The majority of dentists consider apicoectomy advisable in cases of chronic apical infections where the bone, peridental membrane, and not more than the apical third of the root are involved.

The six upper anterior teeth are apiectomized most easily, the lower anterior ten and upper bicuspids less easily, and the molars with difficulty.

Gutta-percha is recognized as the best material for filling the root-canals. The use of chloroform and resin, chloro-percha, or eucapercha in conjunction with the gutta-percha seems to be a matter of choice with each individual.

Where the operation has been followed by check radiograms the operators report a moderately high percentage of successes.

Failures are reported as due to faulty technique, low vitality of surrounding tissue, and reinfection.

For removing the apex of the tooth the bur is given preference over the chisel.

Six months is the average time given for the complete regeneration of bone in successful cases. The time varies with the age and vitality of the patient.

Suturing of the incision is recognized as the preferable method of closing the wound, as it tends to hasten the healing, prevent reinfection, and lessen the after-pain. In cases of extensive involvement packing is advocated.

Opinion is well divided as to whether apicoectomy should be performed by the specialist or the general practitioner. It is generally conceded, however, that unless the general practitioner is well equipped, has a thorough knowledge of asepsis, and has developed a skilful technique, the operation should be performed by the specialist.

The Correspondent wishes to express his appreciation on the behalf of the Dental Society of the State of New York for the comprehensive replies received, from which he was enabled to compile this report.

33 CHESTNUT ST.

Correspondence

Sulfuric Acid in Root-canals.

To the Editor of the Dental Cosmos:

Sir,—In your June issue, Dr. Waas, writing on the use of acids and of sodium and potassium in root-canal work, says: "With acids we might have considerable destruction of tissue, as the acid is drawn up by capillary attraction and *is not self-limiting in its action, as is sodium and potassium.*"

The late Dr. Callahan in his article on the use of sulfuric acid in root-canal work (*Items of Interest* for August 1915) tells us, and shows an illustration of cancellous tissue exhibiting the action of both agents to prove, that *sulfuric acid is self-limiting,* while sodium and potassium is not.

Will you be good enough to print this in your journal and see if we can interest some of our investigators in this line of work, in order to establish once and for all who is correct?

Very respectfully,

Samuel J. Kessler, D.D.S.

New York, August 23d.

Professional Capability and Dental Commissions.

To the Editor of the Dental Cosmos:

Sir,—Your editorial in the August number of the Dental Cosmos inspires one with a feeling of optimism and confidence in the future welfare of dentistry as a profession. The opportunities offered the profession in the present war should be welcomed and taken advantage of, especially by those in the army and navy services. The men serving in the dental corps of the army and navy are representatives of the dental profession, and upon them rests the responsibility of demonstrating the capabilities and importance of that profession. Thus it is to the interest of the profession, as well as to that of the men being treated, that the most capable men be selected for service as dental surgeons in the army and navy. Unfortunately there have been many instances of injustice and inefficiency in the choosing of men for commissions in these departments, so that today many dentists with valuable experience are serving as privates, while inexperienced, newly graduated men are wearing the officer's uniform. I have in mind at the present time three young men who have served hospital internships; each has received training not only in every branch of dentistry, but also in anesthesia, surgery, and medicine: Two of these men are now serving as privates, while the third is awaiting his draft call.

I have in mind also the system of examination of candidates for dental commissions in the navy, which allows the disqualification of men like the abovementioned and the acceptance of inexperienced, inefficient 1918 graduates. I might also mention the fact that, in spite of many vigorous assertions to the effect

that no more commissions could be granted in the army dental reserve corps, four men of the '18 class of one of our dental colleges have received commissions. This, of course, is not only unfair to those who have been trying to obtain commissions since the call for dentists was issued, but is also unfair to the profession as a whole, as it sends forth inexperienced men as representatives when the services of better qualified men could be secured. Many of the dentists now in the service have already shown inefficiency and will probably in time be eliminated; but, had more care been exercised in the selection of dental officers, this elimination would not now be necessary.

Dentistry is destined to make an enviable record in this war; let us hope that this record will be marred as little as possible by occasional mistakes involving injustice and inefficiency.

Very truly yours,

R. A. Clark, D.D.S.

Philadelphia, Pa., August 19, 1918.

Procain and Novocain Identical.

[Reprinted from the Correspondence department of the *Journal of the American Medical Association.*]

To the Editor:

It appears that in certain quarters the attitude is taken that the local anesthetic sold as Procain is not identical with that marked as Novocain. The Subcommittee on Synthetic Drugs of the National Research Council believes it important that this misunderstanding should be corrected, and hence offers the following explanation:

The monohydrochlorid of para-aminobenzoyl - diethyl - amino - ethanol, which was formerly made in Germany by the Farbwerke, vorm. Meister, Lucius & Bruening, Hoechst a/M., and sold under the trademark name "Novocaine," is now manufactured in the United States. Under the provisions of the Trading with the Enemy Act, the Federal Trade Commission has taken over the patent that gave monopoly for the manufacture and sale of the local anesthetic to the German corporation, and has issued licenses to American concerns for the manufacture of the product. This license makes it a condition that the product first introduced under the proprietary name "Novocaine" shall be called Procaine, and that it shall in every way be made the same as the article formerly obtained from Germany. To insure this identity with the German novocain, the Federal Trade Commission has submitted the product of each firm licensed, to the A. M. A. Chemical Laboratory, to establish its chemical identity and purity, and to the Cornell pharmacologist Dr. R. A. Hatcher, to determine that it was not unduly toxic.

* * * * *

In conclusion: Procain is identical with the substance first introduced as Novocain. In the interest of rational nomenclature, the first term should be used in prescriptions and scientific contributions.

Julius Stieglitz, Chicago,
Chairman,
Subcommittee on Synthetic Drugs,
National Research Council.

PROCEEDINGS OF SOCIETIES

Dental Society of the State of New York.

Fiftieth Annual Meeting, held at Saratoga Springs, N. Y., June 13-15, 1918.

(Continued from page 815.)

THURSDAY—*Afternoon Session.*

The meeting was called to order at 2.30 o'clock by the president, Dr. Rich.

The President introduced as the first speaker of the afternoon Dr. B. HOLLY SMITH of Baltimore, Maryland, who read a paper entitled "The Past and Present of Operative Dentistry."

[This paper is printed in full at page 884 of the present issue of the DENTAL COSMOS.]

DISCUSSION.

Dr. R. Ottolengui, New York. There is one great difference between Dr. Smith and myself—there are a number, of course, but I mean one to which I particularly would call attention: He admitted today that he does not like to hear me talk, whereas I just love to hear him talk. The main satisfaction I had in finding my name on the program to discuss Dr. Smith's remarks was that I would necessarily be present to hear them.

I wish to correct an opinion that I see is in your mind. Telepathically I feel you think there is an antagonism between Dr. Smith and myself. I thought so myself for a number of years, until I found that Dr. Smith is the living embodiment of the saying, "Whom he loveth he chasteneth." He feels at liberty to say just what he feels for those for whom he has affection. The more he criticizes me, therefore, the better I like it. After I grew to appreciate that side of Dr. Smith, I got close enough to him to learn more of his real character.

I want to remind Dr. Smith of the Jamestown meeting. Dr. Taggart expounded at that meeting his method of making gold inlays, and a Southern methodistical orator arose and said: "Woe is the day! Today dies all that is artistic in dentistry." I used to live in the South myself, so I got up and said: "Hail is the day! For today is born all the artistic opportunity in dentistry."

Now, what do we find about the gold inlay, and the gold foil filling? We find there is a definite place for the gold foil filling, as well as for the gold inlay, and it takes the same skill, and the same artistic ability, to do one correctly as it does to do the other. I believe that in a small cavity it is almost malpractice to put in a gold inlay. We have no right to cut away good sound enamel and dentin because we find it easier to let our laboratory man make an inlay for us to cement in than it would be to fill it by the methods that we know will make a filling that will stand for twenty-five or thirty years, if we do it correctly. But just in proportion as it becomes our duty to restore an occlusal surface and the true form of the tooth, it becomes our duty to make a gold inlay, and to use the best that is in us in making it.

What shall be our standard of a gold inlay? That every part of the margins shall be as perfect as the best foil filling ever made; and to do that there is no short road, and no easy method, by any means.

To surprise Dr. Smith and the rest of you by not making a long speech, I want to say in conclusion: There is no system in dentistry that is universally applicable, because ours is not a mechanical art. The one pitfall in dentistry is the word "system." We should remember that we are working on living tissue, and there are almost as many variations in human tissues as there are human beings. Some men take six grains of morphin four times a day, and thrive on it; while if another took one-sixteenth of a grain he would die. So it is with all the other tissues of the body. You must be something more than a dentist, more than a mechanic, more than a physician, to determine what is best. We cannot fill teeth with one kind of filling. We cannot say one style of gold is always better than another. We cannot say the inlay is a slipshod method. We cannot say there is only one way of treating a diseased tooth, or that there is only one system of regulating teeth.

Dr. Paul R. Stillman read the Report of the Committee on Practice.

[This report is printed in full at page 893 of this issue of the Dental Cosmos.]

DISCUSSION.

Dr. Leuman M. Waugh, New York. In the report, the chairman spoke of the very unfortunate occurrence of over one hundred British soldiers who, through the vomiting incident to seasickness when crossing the Channel while being returned wounded, died of strangulation because they had appliances in the mouth which could not be quickly removed. The appliances, therefore, that we make must be of such a type that they can be readily removed when necessary!

It was said that certain forms of orthodontic appliances would be more efficient and more hygienic and give better results, perhaps, than any we have used. It is very true that many of us—not only men at hospital centers, but men in little hamlets everywhere—will be called upon, in consultation with physicians, to expand arches and correct malpositions of teeth, because of the mal-adaptation of the parts of a fracture. How can we most readily and easily prepare ourselves for this? It is common knowledge that in all the warring countries abroad the dental profession was called in late, and when called in was absolutely unprepared to take care of the work. Let us start now—it is already late, but we can make efforts to do what we can for the men who are giving their blood and chancing their lives, so we can take care of them when they come home.

I have here a suggestion which I would like to make. The demerits of the suggestion please credit to me, and if it has any merit I shall be very glad. On Saturday, when I left home, we had registered 15,600 men. I am coming more and more to the conviction that there are many men who are working for the Preparedness League who are not registered at headquarters—men who have joined their local units, thinking that made them national members, but it does not. I think we have more men working for the Preparedness League than are in the National Association. Be sure the men who join the local unit have their names and their membership fee of one dollar forwarded to the National Association.

The President. May I ask a question? You speak of the Preparedness League giving their time to United States army men. Do you mean discharged men?

Dr. Waugh. I mean men who are coming home wounded.

The President. The Preparedness League has no access to the man who is not discharged. That man is under the charge of the dental corps.

Dr. Waugh. The idea is for the Preparedness League to get that recognition, and to work as some of the men in New York are now working. I do not know whether I may be allowed to tell, but Dr. Stillman is organizing a unit in which the men are to be given rank. It is

inconsistent with the beneficent service and the work done, not to give them rank.

Those men who can pay for the service rendered are expected to do so. Those men who admit that they are capable of paying are not sent to the League members for service; only those who could not have the work done before they entered the army will receive the work gratis.

Dr. Hayes, who is at the head of the American Ambulance in France, had a great deal of money given to him by some wealthy ladies, for taking care of the wounded soldiers. He would not accept that money until he had sufficient recognition, for the reason that if the dental corps did not have army recognition, a sergeant in the regular army could come around and order the men to do what he wished. We must petition the Government to give us that standing which is consistent with the dignity and the beneficence of the work.

We have wounded men going through New York every day, with legs and arms off, and wounded jaws. They are coming faster than we can take care of them. Are we to prepare ourselves, or are we to admit that we do not know anything about it?

Dr. Frank A. Gough, Brooklyn. The report of the Committee on Practice is of more than usual interest to me this year, and I desire to compliment the committee upon bringing to our attention some very live topics for discussion. Not only is the world approaching its greatest crisis, but our profession is also in the midst of the most critical period in its history, and such time as we may spend here looking to its future will be time well spent.

There can be little doubt that the American orthodontists could be of inestimable benefit in much of the jaw work that is resulting from the war, if some way could only be found to make use of their knowledge and experience. As Dr. Waugh has pretty thoroughly covered that subject, I will omit further reference to it, except to state that I think I can speak for the orthodontists of America and say they will gladly cooperate in any movement looking toward this end.

I see no reason why the efficiency engineer's suggestion should not bear fruit. It seems to me that with the present interdependence of the medical and dental professions, such a plan might include all the specialties of both medicine and dentistry. Such a movement could not succeed unless it had a real leader at its head, however.

I most emphatically differ with the committee in regard to the proper method of developing a specialist. The very reason that orthodontia has outstripped all other specialties in its progress is because it has a great leader whose influence has been felt to a marked degree even by those who have opposed everything he has ever suggested. Such leadership is needed in every one of the other specialties, if they are to fulfil their proper function.

Some of the ablest men practicing the specialty of orthodontia today have never practiced general dentistry. I cannot consider my own ten years of dental practice otherwise than a severe handicap to attaining success in orthodontia.

Children who go to the specialist as frequently as they have to go to an orthodontist, for a period of years usually, become just as loyal and enthusiastic friends of the specialist as any general practitioner could wish. They often become attached to the specialist more than they do to the family dentist.

If the committee's idea of the natural evolution of a specialist is correct, then every dentist should first learn the jeweler's trade, the toolmaker's trade, engineering, medicine, surgery, and numerous other vocations that have a bearing on the profession.

The preparation for any specialty should be so broad and comprehensive that there would be no need to go through some other profession or business to reach it. The time ought not to be far distant when all the colleges preparing students for the medical and dental professions, or any of their specialties, will have the first two years in common, with

the last two given to the specialty they may select for their life-work.

Postgraduate instruction that aims only to "clear up some of the more perplexing phases of their work" is very superficial indeed to men in practice. What men need, who have decided to take up a specialty, is an intensive course in the foundation principles upon which that specialty rests. The little details and niceties are afterward easily added to such a foundation.

I am in full accord with the committee's intimation that the law should define the specialist and protect the public against those who are incompetent to practice it.

We cannot deny that there is a real "danger of specialization in its narrowing influence;" but in this case of orthodontia, its leader so fully realized this and impressed it so indelibly upon his students that they have not only made their influence felt in dentistry, but as a class they are above the average in broadmindedness. As a rule, the men who take up a specialty are men who are not satisfied with their knowledge or skill, and are willing to study and work to improve themselves. If they continue in that attitude, they cannot become narrow. The real student views the specialty as a constant incentive to broaden his knowledge along all lines and especially those of the collateral sciences.

Those who are eager to specialize because they think they will find an easy road to high fees and short hours are doomed to suffer a great disappointment. The men who have caught the real spirit of specialization find themselves with less leisure, not more. To be successful in any specialty demands constant application and study, not only of the development of the specialty itself, but of all the collateral arts and sciences which have a bearing upon it.

Dr. Daniel H. Squire, Buffalo. While the sense of this excellent report of Dr. Stillman's is rather fearful of the future standards of dentistry, and the underlying thought seems to be one of better service, it also describes a growing desire upon the part of the dental man for intellectual advancement, which is most encouraging. There is a universal desire for greater efficiency in our treatment of patients, so that our relations with them may be one of thoughtful care, rather than one of an empirical nature.

The word "service" means the performance of *duty* in any occupation. It is of the greatest importance to understand the meaning of duty in order that we may render a worthy service. Education is the medium through which we appreciate the relationship of practitioner to patient, and the broader the foundation the higher the ideals, and then will come the full realization of duty.

I do not believe that the specialist who has a true sense of duty, and who has been well grounded in the fundamentals of dentistry, will ever become so absorbed in his special line of work that he will lose interest in the other branches of his profession. On the other hand, the young man who announces himself as a specialist for no other reason than that of not knowing any better, is not a serious menace to the prefession or to the community in which he resides, at least for any length of time. When he was in college, he probably followed the motto: "Never study today what you can bluff tomorrow," and instant specialization after graduation is the natural outcome.

The only way in which to prevent the average young man from taking up a specialty before having had any experience in general practice is by increasing his knowledge. This is being accomplished in two ways; first, by raising the preliminary educational requirements, and second, by increasing the scope of the dental curriculum.

The preliminary educational requirement has undergone constant revision and extension, until now it consists of a full four-year course in a standard high school, the instruction including one year each of chemistry, physics, and biology. It is only a short step to a preacademic requirement of one or two years of college work, and a little later the full arts course. This is none too great when we realize how diversified are the demands of our profession and how im-

portant are its teachings in the preservation of health.

It has been said that ninety per cent. of the college men who are engaged in this great war have been successful in whatever undertaking they have pursued, and it will be found equally true of the dental student, provided his mind has been well trained prior to entering upon the study of dentistry. This is a practical test of the value of academic training.

With regard to the dental curriculum, it is well known that, twenty years ago, dental instruction was not only inefficient in the teaching of operative and prosthetic dentistry, but extremely superficial in those fundamental subjects which are so essential for the development of the student mind. Dr. Stillman has enumerated the changes which have taken place since that time, and it is only necessary for me to emphasize the early conditions by alluding to a paper written by Dr. James Truman of Philadelphia, entitled "Wanted! a Pathological Sense." Dr. Truman appreciated the great need of a broader scope in dental training.

Today, in the four-year course of dental instruction, there is little choice between the first two years of medicine and those of dentistry. The advantages for clinical instruction have increased to such an extent that a dental student has every opportunity to familiarize himself with the various operations in dental practice. Many changes have been made toward increasing the effectiveness of the instruction. For instance, the treatment of root-canals and the extraction of teeth have been eliminated from the floor of the general infirmary, and the student is taught to do these operations under an environment of surgical cleanliness.

Objection has been made to the introduction of English composition and rhetoric into the present dental curriculum. If those persons who complain of this advancement in dentistry could have the opportunity of correcting student examination papers for one day only, they would become the strongest exponents of such a course. Encouragement of the student in speaking correctly and writing a paper in which the thoughts are arranged in proper sequence, is one of the most helpful kinds of dental instruction. Even members of dental faculties need not be discouraged from taking such a course.

These days are days of service to our Maker, our country, and to future generations; and I thoroughly believe that one of the greatest benefits of this war will be to make the American people realize more than ever a keen sense of duty and the giving of a higher service, no matter what occupation may be. This realization of one's responsibilities will exert a wonderful influence toward a co-operative spirit between the teaching faculties and student bodies of dental colleges. There will be a greater desire for work upon the part of the student; he will feel that he is in college for a purpose, and that every moment is golden in his search for knowledge. The *personnel* of the dental faculties will change, and those who are left will assume a different attitude toward their duties; the lectures and clinics will be enriched through thoughtful preparation and study, rather than formulated while coming to the lecture hall. This change is already being felt, and dentistry is unfolding a glorious future.

The Correspondent, Dr. Arthur W. Smith of Rochester, then presented his report.

[This report is printed in full at page 914 of this issue of the Dental Cosmos.]

DISCUSSION.

Dr. A. S. Walker, New York City. Your Correspondent is to be congratulated upon his choice of a subject, and upon the comprehensiveness of the questions propounded by him. It is regrettable, however, that these annual reports, which are always most timely and interesting, do not receive a larger percentage of responses from those honored by the request for an opinion.

The speaker, being in agreement with the general conclusions drawn by your Correspondent, will confine his discussion to the questions raised by the dissenters,

and to emphasizing the more vital points in the correspondence.

In a consideration of this subject it is essential to determine if the operation is within the scope of good surgical practice. The evidence submitted by your Correspondent, and the observations of unprejudiced students, strongly favor the affirmative.

Kells' objections are certainly unconvincing. Had he been more specific in setting forth his objections he might have escaped the suspicion of being swayed by prejudice. With Blum reporting 98 per cent., Thoma 95 per cent., Furnas 90 to 95 per cent., Brooks and Nodine 90 per cent., and Rhein 75 per cent. of successful apicoectomies, it would appear to be a satisfactory operation. However, if Kells' replantations are equally satisfactory there is apparently no good reason for his switching to the operation under discussion.

Grove is more specific, and questions if there is a normal regeneration of bone after these operations, basing his conjectures upon his observations. He tells us he does not believe that tissue attachment to the root-ends ever takes place, and that therefore these operations are failures. He also questions the value of roentgenographic evidence of these processes. If such evidence alone is unconvincing, why ignore the clinical history of cases of focal infection? There is abundant evidence of cures in these cases.

Considering the cause of failures, ordinarily they may be attributed to inoperable cases, faulty technique, and what is probably the most frequent cause —reinfection due to bad root-canal work. The importance of this phase of the operation cannot be overestimated; for in spite of the educational work that has been carried on during recent years, much bad root-canal work is still being done; and here let it be said again, that every step in the root-canal filling operation should be guarded with strictest aseptic precaution. It is hoped that in this connection some steps will be taken by the profession to adopt a standardized technique for this work.

Should the operation be done by the specialist or the general practitioner? If the services of a skilful specialist are available, the patient's interests demand that he should have the advantage of such services. While I agree with Dr. Howe that any dentist can perform the operation, it is true only in the sense that any dentist can extract teeth or correct a malocclusion. Apicoectomy is a very simple operation, and yet to secure the best results the operator should possess skill acquired by experience.

The question of equipment in a material sense is *nil,* since a few dollars will purchase all that is necessary.

The charge that the general practitioner is unaccustomed to operating under aseptic conditions, and therefore is not competent to perform these operations, is only too true. It is for the profession to attack this problem, and the speaker believes that a standardized technique for root-canal work should be the first to receive attention. Its application to other procedures will naturally follow.

Dr. L. A. Timerman, Fort Plain, N. Y. Our Correspondent has very carefully covered the ground of apicoectomy with his questionnaire. Not only carefully, but he has endeavored to bring out every phase relating to the operation. His whys have been insistent. This method with its brevity is to be greatly commended.

The resection of roots where pathologic conditions exist has passed the hysterical stage, and we no longer fear another "emetin" bugaboo, with its backlash.

Since it is definitely known that focal infections cause so many systemic disturbances, the dental profession has taken cognizance of the fact that it is in their field of operation, and are now looking forward to a standardized method for the operation.

Two very important questions at once arise: How and by whom are these operations to be performed? In following the summary of our Correspondent a very clear and comprehensive technique can be deduced. The fact that asepsis is known by all to be the important factor in surgery, our Correspondent has evi-

dently considered as axiomatic. But he recites in detail the tooth-roots most easily amputated, when and how the root-canal should be filled, the best method of removing the apex, and when suturing is preferable to packing.

However, the last question submitted by our Correspondent, "Should the operation be performed by the general practitioner or the specialist?" arrests our attention, and it should answer our second important query. Here the replies are greatly at variance, but the deduction from these replies was in favor of the specialist. As to the specialist's technique being superior, his skill developed to a greater efficiency, his equipment, both surgical and office, better adapted, his speed at operating being greater, and his knowledge of conditions that would contra-indicate operating, we most positively affirm.

No ulterior motives can be attributed to the authors advocating the specialist. No doubt they are all specialists. As we all do, they recognize exquisite skill, the result of practice, to be the great factor in getting results.

Today the highly specialized man is sought in every walk of life, and we unhesitatingly admit his *par excellence*. At the same time, the average dental surgeon who is strictly consciencious in his undertakings should not be discouraged in attempting this class of operations. In making this statement I am not considering the operator or the operation so much as I am certain classes of patients. Neither am I confining my arguments to this great state of ours, where transportation facilities are wonderful and specialists numerous, but am taking into view more remote sections.

This same opinion prevailed a few years since regarding orthodontia. Today we find thousands of irregularities corrected by the general practitioner in which patients directed to the specialist could not have availed themselves of the privilege, and would today be living monuments of shame to the profession. Radiography has been developed in the same manner, and no dental equipment is now complete without an X-ray outfit.

In his general conclusions our Correspondent says, "The majority of dentists consider apicoectomy advisable." He further concludes—and is fully justified by the replies—that "Unless the general practitioner is well equipped, has a thorough knowledge of asepsis, and has developed a skilful technique, the operation should be performed by the specialist." The sum total of the argument is this: Apicoectomy is advisable; if you are not a specialist, or cannot get your patient to a specialist, side-step; extract or let it remain a pathological tooth.

Every community distantly located from the centers of specialists has the right to expect the general practitioner, the dental surgeon, to be qualified to perform ordinary operations of orthodontia, apicoectomy, the treatment of pyorrhea, to be versed in radiography; and every man should qualify.

We have all been reading during the past three years the articles in our journals on war surgery of the jaws and face, of the septic conditions under which the wounds were caused, and the time which often elapsed before the first treatment. How do such operations compare with the resection of the apex of a root by an almost painless and bloodless operation —an operation requiring not more than a half-hour? Dr. Howe's statement read by our correspondent, "A simple thing; any dentist can do it," looks very reasonable. It is not a case of life or death, except to the tooth, and I do not know that the second state is worse than the first.

The upper anterior teeth most frequently claim the attention of the operator because of their prominence and accessibility. When all known methods of treatment fail and the specialist is beyond the reach of the patient, it is plainly the duty of the dentist in charge to apicoectomize the root. It is also his plain duty to perform that operation with the greatest possible precautions, antiseptically and surgically. The radiographing of the infected area is a necessary safeguard, and frequent films showing the progress of bone regeneration, if any, are reminders of the success or failure of

the operation and are of great value to the general practitioner who is making every possible endeavor to succeed.

It is not the intention to advocate that all operations about the mouth be done by general practitioners. But periapical infection is so common that the man who will bestir himself can soon acquire the necessary technique. It is for the benefit of such general practitioners that this subject is being discussed today, but the greatest benefit will be received by our clients, for whom I am making this plea.

Dr. L. L. Mulcahy, Batavia. We have listened to a most complete report on the subject of apicoectomy, compiled at the expense of considerable time and labor by our Correspondent, Dr. Smith, who deserves much credit for the excellent manner in which he has presented it to us.

This report was compiled from replies received from experts on the subject. You have heard it discussed by men who have had considerable experience in amputation of root-ends, and know what they are talking about. In selecting me to discuss this report, I presume the idea was to select a general practitioner who knows very little, if anything, about apicoectomy, to see what we think about performing this operation.

I was glad to hear Dr. Stillman say that we should broaden and spread out. I am one of those located in a city too small for specialists, where, if you wish to render the best service to your patients, it behooves you to specialize in all the various branches. One of the things I have taken up is radiography, which I think is essential to intelligent root-canal work, and to apicoectomy.

I believe that the average general practitioner who will equip himself with an X-ray machine, sterilizing outfit, proper instruments, and a good assistant, can successfully take care of the simple cases. By these I mean the ones most accessible and where the area involved is not large, assuming that the root-canal has been properly filled.

For the general practitioner I shall outline a little technique. Ten or twelve years ago I attempted to do this in a more or less haphazard way, but of late, I am glad to say, I have been quite successful with the method I have adopted.

I prefer novocain anesthesia. I have tried nitrous oxid, but have not been successful. I first make a long incision, retract the flap toward the lips, using sharp burs, and normal saline solution for irrigating. I have always packed the wound lightly with iodoform gauze instead of suturing, but in many of the simple cases, where the incision is not large, I believe suturing would be preferable, as I have had some post-operative pains, and that would do away with them.

I believe we should be prepared to take care of all these simple cases where we are not accessible to the specialist, and advise our patients to submit to the operation, especially in cases where a front tooth is involved, as in my opinion an apicoectomized tooth is preferable to a bridge. If you have a tooth, however, where the risk is too great, it is better that a specialist should treat the case.

Adjournment to 8 P.M.

(To be continued.)

Eastern Association of Graduates of the Angle School of Orthodontia.

Ninth Annual Meeting, held in New York City, May 6 and 7, 1918.

THE ninth annual meeting of the Eastern Association of Graduates of the Angle School of Orthodontia was held on Monday and Tuesday, May 6 and 7, 1918, at the Vanderbilt Hotel, New York City.

MONDAY—*Morning Session.*

The meeting was called to order by the president, Dr. Frederic T. Murlless, Jr., of Hartford, Conn., at 10.30 o'clock.

In the absence of the vice-president, ex-President H. C. Ferris of New York occupied the chair while President Murlless read his address, as follows:

President's Address.

By FREDERIC T. MURLLESS, JR., Hartford, Conn.

Ladies and gentlemen,—We are gathered again in this familiar place for our ninth annual meeting, and it is a pleasure to be permitted to extend to all a hearty welcome. It is sincerely hoped that the program which has been arranged will prove as great a source of pleasure and profit to you as its preparation has been to your officers, to whom as president I wish to express my appreciation of their support and co-operation.

In reflecting upon the interests of this association, it has occurred to me that the history of all the arts and sciences is much the same, in that their beginnings have all been within the range of the obvious, while all alike have suffered from too swift and sweeping generalizations based upon a degree of success measurable only in terms of inexperience. With experience and experiment as teachers, progress has always been problematical, and the dissemination of the slowly accruing knowledge has been restricted and obstructed by the personal limitations and antagonisms of men who often have had little to impart.

The age of empiricism as a stage of adolescence is interesting historically, though trying as an experience, and survival of this stage is a dependable index of the vitality and permanence of every science. Resourcelessness in the solution of oft-recurring problems by means of mere experience must lead to study in allied lines of thought, and has been the spur to effort and development in individuals, and their final grouping in recognition of mutual purpose.

The dominance of theory as the moving force, and practice as the proof, marks the establishment of each science, or branch of professional endeavor, as an independent organism. To this stage Orthodontia has long since arrived, but it is a notable fact that the initial impulse of the past has so survived as to be recognizable as the binding and directing force in this association.

It is ground for legitimate pride, in which every member of this association may well participate, that our active interests as a body extend to the allied fields of child hygiene, the pathology of the digestive tract, biology, anthropology, orthopedics, the study of the ductless glands, heredity, comparative anatomy, art, engineering, etc., as well as to the more immediate interests such as etiology, anatomy, and metallurgy. It need but be said that in all these various fields this association has a vital interest, and in many of these there has already been done work of constructive value by its

members. We are each year making fresh discoveries in the common ground which lies between us and many of the older sciences, the cultivation of which produces fruit for the labors of both, and profit for each.

With so remarkable and creditable a record already made, it should not be forgotten that no small responsibility rests upon this association as builders of a great science which has to do with the correction and prevention of the most prevalent deformity known to the human race.

By way of recommendations and suggestions for the future, your president asks your attention to a few items pertinent to our progress, and with the purpose of widening the influence of this association.

First: That in order that the officers may be unhampered in the management of the affairs of the association, the dues should be increased to five dollars per annum.

Second: That orthodontia may in the future be held in the keeping of educated men of the highest type, that this association appoint a committee to inquire into and recommend a plan for establishing a scholarship of such character as to attract and develop men qualified to become leaders in our specialty.

Third: That consideration be given to the standardization of X-ray procedure, for the purpose of eliminating the variations in electrical potential distance, angles, and position of films, and increasing the value of comparison of consecutive skiagraphs of the same area.

Fourth: That the incoming president appoint a committee on the sequences of orthodontic procedure.

In conclusion, permit me to express the hope that the ever-widening sphere of influence of this association may continue to be the inspiration of its members, and to thank you for the great pleasure and honor that it has been to me to serve as your president.

DISCUSSION.

Dr. H. E. Kelsey, Baltimore, Md. I am heartily in favor of raising the dues to five dollars. It has always seemed to me that three dollars was rather an inadequate amount of dues to properly conduct our society, and I agree with the president that it would be a very good thing to increase the dues. I very much enjoyed the address, and I believe the recommendations in it if carried out will be of great value.

Dr. R. B. Stanley, New York. It is a time-honored custom that at the opening of a meeting like this we listen to the reading of the President's Address, and I think it is a most wholesome one. It gives us an opportunity to think over those things that have been done, and also those things which we have not done, and it gives us a few moments for reflection in which to make resolutions for the future.

In our meetings during the year that has just closed we have had in our program a great deal of constructive material, and President Murlless has pointed out the way in which we can continue that work. I have noted with much satisfaction, in talking with the men at the meetings, that underlying all this has been a spirit of good-fellowship. I do not mean the good-fellowship that is just a clasp of the hand between two men of the society; but I mean the fellowship that urges you to get out and know the world as it is. This is probably the largest society of its kind that meets regularly for this kind of work. Perhaps you do not realize that. If we want to progress, we need to get out in the world and to know the members of the dental profession, and the members of the medical profession as well. I think this is a proper time for us all to resolve that the spirit that has been shown in the past will continue, so that everyone will feel he is welcome to come to these meetings. I, for one, intend to do that, and I hope all the rest of you will do the same.

Dr. G. W. Grieve, Toronto, Canada. I thought it might not be out of place to mention a thought that has come to me in teaching orthodontia, and any of you who have had experience in teaching this branch in the dental schools must

have had some of the same difficulties that I have had. It might be an advantage if a committee were formed with the object of determining a definite course of instruction in orthodontia, and its limitations. I simply offer that suggestion to bring out the thought of the members as to whether we should not all get along better if we could decide upon a definite course in orthodontia in dental schools.

Dr. B. W. Weinberger, New York. There is one point in the President's Address, as to the formation of a certain committee—that was one suggestion I did not quite comprehend. I think it would be an opportune time for us to have a committee appointed to arrange for a uniform examination blank or report to be used by all our members, so that when we wanted information we could call on the different members, and get reports of cases that would be uniform. We all have our own ideas, and if there is anything perplexing, something that we would want to consult one another about, each one's records would be valuable to the other. If that is not what the president meant, perhaps that could be included in the recommendations of the Committee on the President's Address.

The President. Perhaps a word of explanation in regard to that paragraph would make my meaning clearer. I will read it again: "That the incoming president appoint a committee on the sequences of orthodontic procedure."

My idea is this: We have had various groupings of orthodontic cases. The major and important grouping, as a starter at any rate, was Angle's classification. But no two cases are alike, and many cases that are doubtfully in the same Angle classification require different treatment, and allow wide latitude for the personal element. I think it would be helpful, not only to the man who has some good reasoning in regard to his attitude—not only to him, because of the benefit of telling it and broadening his own ideas, but also to those who have perhaps not run across such a case, or had such an unfortunate experience as to find their attitude was not quite correct, and who might be saved from unnecessary difficulties.

I know that many referred cases are a bugaboo to many men, and for the reason that there is no real reasoned conclusion for an accepted attitude toward any particular case; and yet there must be a right way, still allowing for the personal element.

In regard to the matter of the scholarship, my idea was, in a word, that a committee might take up the question from the attitude of the Rhodes scholarship. There is no reason why our profession should not be drawing on the potentialities of riper men than we, men created by this age by their opportunities to be bigger than we. Other branches of endeavor are producing them, and it would not be at all out of place for us to produce a few ourselves. The Eastern Alumni Association of Angle Graduates consists of men who are known no longer as boys; and yet the burden of this work rests upon us. Dr. Stanley was right about it. We have a big responsibility, and we should make sure that what we sow falls on good ground.

It seems to me as though we were really at this time the only group of men upon whom this duty falls.

Dr. Wm. G. Law, New York. I enjoyed the President's Address immensely, and I think I agree with everything he said. I would even be in favor of raising the dues much higher. It occurs to me that we could readily pay an amount which would enable the society to apply a portion of it to such a worthy thing as a fellowship or scholarship.

I am quite in accord with everything the president has said.

Dr. A. W. Crosby, New Haven, Conn. I move that a committee of three be appointed to consider the recommendations contained in the President's Address, and make a report thereon to the society later in the meeting.

The motion was carried.

The chairman appointed the following as the Committee on President's Address: A. W. Crosby, New Haven; H. E.

Kelsey, Baltimore; J. V. Mershon, Philadelphia.

President Murlless then resumed the chair, and a short recess was taken.

The President again called the meeting to order, and introduced Dr. HOWARD T. STEWART of New York City, who spoke on the following subject, "Restoring Missing Teeth after Orthodontic Procedures; and Thoughts on Moving Teeth Loosened by Riggs' Disease," illustrated by lantern slides.

[This paper will be published in a later issue of the DENTAL COSMOS.—ED.]

MONDAY—*Afternoon Session.*

The meeting was called to order at 2.30 o'clock, by the president, Dr. F. T. Murlless, Jr.

Mr. LESLIE SPIER, of the American Museum of Natural History, gave a lecture on "Physiological Age: The Relation of Dentition to Body Growth."

[This paper is printed in full at page 899 of the present issue of the DENTAL COSMOS.]

DISCUSSION.

Dr. H. C. Ferris, New York. We are all interested in assisting Mr. Spier in collecting this data, which would be of such practical value to the profession, and if each member would give ten or more records I believe that would start the ball rolling. Efforts along this line have been made in our society before, but owing to the time required to collect the data, few of our members have complied, and the effort has proved to be more or less a failure. I make this as a motion: That those of us who feel able and willing should raise our hands and agree to furnish Mr. Spier with such data as he may wish for ten cases of adolescence, so that he may have some basis for continuing his work.

Mr. Spier. Data are not hard to obtain. I do not want a great deal—I am trying to place things before you in the easiest way. I simply say, "Let me see your records." When you get a case and prepare to take the ordinary record, ask the patient to step on the scale, and pull the stature bar over his head, and you have at once two more indices to help us and yourselves; for often those two indices will give you a pretty good insight of what you may expect that dentition to be like. This data will not be packed away in big fat tomes and allowed to get dusty, but will be of use to all of us. I ask that you be good enough to allow me—or someone who is interested as I am—to see your data. This can be done with the least inconvenience to you, I am sure. As for those who are out of the city and not available, I shall be pleased to have whatever you send. Ten cases each from 35 men would be a series of 350. That would be a very small series. Let me have all you can. If you can give me fifty without encumbering your secretaries, let me have them.

Dr. J. Lowe Young, New York. As I understand it, in addition to the age, weight, and height, Mr. Spier wants the time at which certain teeth erupt.

Mr. Spier. The better way would be to record the exact time at which the tooth erupts, by whatever criterion you reckon it. If you tell me you have a boy of ten years with such and such teeth, I could calculate at what time he must have erupted his teeth, if he is an average individual.

Dr. Young. From my own records, I would not be able to give the exact time at which the teeth erupt. While I could not do that with my past cases, it would not be much of an effort to do it with present or new cases. I did weigh and measure some of my patients, but for another purpose, and I do not know now what became of the records.

Dr. Milo Hellman, New York. Ten cases would be very little; you can easily get three times that many by following a certain scheme. What Mr. Spier wants is what you already have in your possession. The age, weight, and height you can easily take. You have the casts at the age at which the patient came to you. If we in New York, or within easy access of New York, would grant Mr. Spier permission to look at our records,

we would not have to describe the cases. Just show him the record, and he will do the rest. He is interested in the mouth at the age at which it came to you, and not in the outcome. All that is necessary is to accord him the privilege of having free access to our collections of models, and furnish him with the data of age, height, and weight. That would be sufficient to assist him to establish quite a series of records.

Dr. Ferris' motion was carried.

Dr. F. L. Stanton, New York. I would like to move that a committee be appointed to standardize the record forms so they may be easily distributed, and the data be gotten in proper form.

Dr. Bernard Weinberger, New York. That was what I referred to when I discussed the President's Address this morning. We should cover not only this field, but take men like Hrdlicka, or Mr. Sullivan or some of those other men at the museum, and see if we cannot get the records broad enough to cover all they want, because there are other questions they are investigating at the same time.

Dr. Stanton's motion was carried.

The President. We all deeply appreciate the courtesy and the point of view of Mr. Spier in bringing this matter to us, and realize it is a labor of love, as our activity in regard to this subject must needs be, and we have a fellow-feeling for him.

A vote of thanks was tendered to Mr. Spier.

Dr. Alfred P. Rogers of Boston, Mass., then read a paper entitled "Exercises for the Development of the Muscles of the Face, with a View to Increasing their Functional Activity."

[This paper is printed in full at page 857 of the present issue of the Dental Cosmos.]

DISCUSSION.

Dr. A. L. Johnson, Springfield, Mass. Does Dr. Rogers find it advisable to use the whole system of exercise in all cases?

Dr. Rogers. No. In class II the pterygoid and posture exercises; in class I the exercises for the general development of the face; in class III the muscles worked in the opposite direction. The entire system is an effort of the will, and it is a wonderful help if you can coordinate the mind and the muscle. We know of the athlete who can control any set of muscles at will. Anyone who undertakes this kind of work should be able to perform the exercise himself. There is not a thing I have taught my patients to do that I cannot do myself, and I do not attempt to instruct a patient in any exercise unless I know I can do it myself.

Dr. Julius Minez, Newark, N. J. What success has Dr. Rogers had with the short upper lip in class II cases?

Dr. Rogers. The lip can be changed in shape. One of those cases, which I referred to as a persistent mouth-breather, is showing a great deal of improvement in lip form. It is not so much a short upper lip as the contour of the mouth in general, and its habits.

Dr. C. A. Hawley, Washington, D. C. I have seldom listened to a paper that shows as much good sense and careful observation and experience as this one. It occurs to me that it affords practically the only solution of the retention problem. It refers to what I think we all believe is the etiology of malocclusion, the lack of function, that is, in the majority of cases. Unless in the end, after our mechanical work, we can restore something near the normal function of the teeth and the muscles surrounding them, retention is almost hopeless. We have all had cases, and it is unnecessary to go over them, where mechanical retention has failed. They recur again and again, and there is no time when we can remove the retention and say the case is finished and the teeth will stay.

I have had no experience whatever in these exercises, so I cannot discuss the paper in detail. It has often occurred to me that it is possible to change the food habits of people in our civilized state. I think I referred to that in an address about 1908. If we can change

the food habits of the child and aid it by these muscle exercises, I think there is hope, and the results Dr. Rogers has had are, to say the least, extremely encouraging.

There is another tendency shown in Dr. Rogers' work which is extremely gratifying, and conforms to my later experience, and that is, the tendency toward simpler appliances. The whole paper impresses me more than anything I have heard in a long time. It is along lines that are going to be more and more successful in the future.

Dr. H. E. Kelsey, Baltimore, Md. I do not think I have sufficient experience along these lines to discuss the paper, but I cannot let the occasion go by without expressing my appreciation and obligation to Dr. Rogers. I believe this paper marks an epoch in orthodontia. A man I had not seen for some years said to me this morning that he did not know what orthodontists needed, but he said we needed something. We need this; it may not be all we need, but it is a great step in the right direction. The great change in the faces Dr. Rogers showed us was more significant and pronounced than anything I have seen in any similar cases. It is not alone that the protrusions were corrected and the profile was improved, but it seemed that almost every bone in the face had been altered, and strengthening harmony given to the whole head.

As Dr. Hawley has said, we have had cases where retention seemed hopeless, and we have had other cases where we thought we secured wonderful results, estimating exactly the time at which we could take our retention off. Those were undoubtedly the cases where function was fully restored. Those where the retention fails are those in which the function has not been restored. I know of no paper that has stimulated me so much, for a long time, as this one by Dr. Rogers.

Dr. A. Leroy Johnson, Springfield, Mass. I believe that Dr. Rogers' paper is a distinct contribution to a real science of orthodontia. An orthodontia which concerns itself with nothing more than the mere movement of the teeth, by means of appliances cemented to them, has not much of an excuse for being. There is one thing that occurred to me during the reading of the paper, that is, the necessity of evolving scientific tests to distinguish definitely the different natures of these cases; also the need of instruments which will indicate progress made in the training the essayist has outlined in his paper.

Dr. H. C. Ferris, New York. I want to compliment Dr. Rogers on the beautiful presentation of this scientific subject. A few years ago I presented to you a little rubber exerciser, and it was generally scoffed at, and very little attention was given to what was termed a "rubber rope." With that rubber exerciser I have been accomplishing the development of the muscles of the face and mastication by systematic exercises. In class II cases I instruct the child to roll forward on the rubber rope, and in class III to roll backward and bite as hard as possible a definite number of times at regular intervals on teeth which are under orthodontic pressure. For the orbicularis oris I have the child learn to whistle, and keep the fingers out of the mouth, as I found that a dangerous practice. Dr. Rogers has anticipated a report of my work, but has done the subject justice, and I congratulate him.

In reference to Dr. Hawley's idea of dietetics, I want to predict that the question of salivary analysis will eventually direct the dietetics of our patients. Through this means I am directing the diet and controlling the general physical condition of my patients in sustaining the tone of the alimentary canal and eliminating many of its acute and chronic diseases.

I am delighted to have heard this paper, and I hope it will have far-reaching influence.

Dr. G. W. Grieve, Toronto, Canada. I would like to add my word of commendation to the paper Dr. Rogers presented. One phase of it pleased me particularly, and that was the exercises which would tone the orbicularis oris muscle. We have all seen many patients with that terribly inert condition of that muscle

which almost makes us decline to attempt to treat the case. That particular point was very pleasing to me, and I am much encouraged now to take on those cases that I did not like the appearance of before.

Dr. J. V. Mershon, Philadelphia, Pa. I cannot let this occasion go by without expressing my appreciation of the work of Dr. Rogers. I hope he will carry it farther. I am reminded of a few records I have made in my own cases of the connection between mal-development of the bones of the face, which is sufficient to produce malocclusion, and the general mal-development of the whole child. I have made this statement on other occasions, and think if the men of this organization were to make a careful analysis of their patients, and obtain the history of their cases, they would find that where there is malocclusion to any extent we have many defects in the muscles and bones in the other parts of the body. I was hoping Dr. Rogers, in closing his paper, would express his conclusion a little differently; that he would have said orthodontia not only embraces the moving of the teeth in their relative relations to each other, but that all the organs and all the tissues of the mouth must be restored to their normal function.

Another important item which Dr. Rogers touched on, but with which he did not go quite as far as I would have liked to see him, was in expressing himself in regard to the various appliances. We have a large variety of appliances which are now in general use, but I think the ideal appliance is one which interferes the least with the normal functions of the tissues and organs of the mouth.

Dr. J. A. Gorman, New Orleans, La. Dr. Rogers has given us something that will doubtless fill a long-felt want. I should like to see him perform those exercises for us, so that we could get a better idea of the movements of the muscles, especially in the exercise of the orbicularis oris.

The President. I had a sort of kindergarten course with Dr. Rogers about a month ago, which rather opened my eyes. In fact, I was rather stunned at the scope it presented to my mind at the time. I think perhaps Dr. Rogers felt I was not as enthusiastic as he would have wished, but I have thought of it a good deal since that time, and have been ready for another step in this matter. I have enjoyed the paper today, even more that the rest of you, I am sure, unless you have had the privilege of hearing this matter spoken of before.

Dr. Rogers (closing the discussion). I want to thank you all for the very kind way in which you have received my paper. There is much more that I might tell you, but I do not want to speak too soon. I want to be positive of the things I do for my own patients. There will be more interesting results to come later.

The meeting then adjourned to 10 o'clock Tuesday morning, the Monday evening session being devoted to an informal dinner for the members and their guests, including the ladies.

(To be continued.)

THE DENTAL COSMOS

A MONTHLY RECORD OF DENTAL SCIENCE.

Devoted to the Interests of the Profession.

EDWARD C. KIRK, D.D.S., Sc.D., LL.D., *Editor.*
L. PIERCE ANTHONY, D.D.S., *Associate Editor.*

PUBLISHED BY THE S. S. WHITE DENTAL MFG. CO., PHILADELPHIA, PA.

SUBSCRIPTION PRICE, including postage, $1.00 a year to all parts of the United States, Hawaiian Islands, the Philippines, Guam, Porto Rico, Virgin Islands, Cuba, and Mexico. Canada, $1.40. To other foreign countries, $1.75 a year.

Original contributions, society reports, and other correspondence intended for publication should be addressed to the EDITOR, Lock Box 1615, Philadelphia, Pa.

Subscriptions and communications relating to advertisements should be addressed to the BUSINESS MANAGER of the DENTAL COSMOS, Lock Box 1615, Philadelphia, Pa.

PHILADELPHIA, OCTOBER 1918.

EDITORIAL DEPARTMENT

Expansion of the Army Dental Corps.

WHEN the United States entered the European conflict the apportionment of dental surgeons provided by law was one-tenth of 1 per cent. of the army *personnel,* or one dental surgeon to each thousand men. To all who were cognizant of the facts of the situation it was clearly evident that the allotment of dental surgeons was totally inadequate for the effective care of the dental needs of the army. Basing the working capacity of a dental operator on a total of two thousand hours per year, which is a liberal estimate, and leaving no margin for loss of time, if his service were equally apportioned it would make an average of two hours annually available for each of the one thousand men under his care. Two hours per year per man is wholly insufficient for the proper care of his dental organs, and realizing that fact the dental committee of the Medical Board, Council of National Defense, took active steps toward providing a more efficient army dental service by recommending an increase in the *personnel* of the Dental Sur-

geons Corps. The seed thus sown has at last borne fruit, for announcement has just been made of an authorized increase of 100 per cent. in the *personnel* of the corps, so that the new ratio will be one dental surgeon to each 500 of the army *personnel,* with three dentists to each base hospital.

We are informed that 8981 commissioned dental surgeons plus 10 per cent. for replacement will be required for active service by July 1st of next year. There are at present in round numbers 3500 dental surgeons on duty, with 2500 on the reserve inactive list, and of these latter it is probable that at least 1000 will be called to active duty. The 5500 additional dental surgeons needed to make up the quota of 10,000 required by next July will be made up by new commissions, of which it is estimated that 2500 will be obtained from conscripted dentists now in the ranks, leaving from 2000 to 3000 to be obtained from other sources.

The effects of this extensive expansion of the Army Dental Surgeons Corps will be fundamental and far-reaching. The most important and basic consideration is the benefit which is wrought by this enlargement in the *personnel* to the morale of the corps itself. There can hardly be any factor which exerts a more demoralizing influence on the character of an individual than to place him in a position where he is expected to produce results that he knows to be, in the nature of the circumstances, impossible of accomplishment. It is precisely that kind of situation in which the army dental surgeon has been placed when he has been required to look after the dental needs of 1000 men—a task which no one can do properly, and involving the inevitable result that it is done improperly, or to a considerable degree it is not done at all; there is no other alternative. The result so far as the dental care of our soldiers is concerned is obviously that they could not receive the full measure of dental attention they require, for which reason, though valuable as far as it went, the army dental service under the old apportionment necessarily fell far short of what it could be and should be. The new allotment will go far toward correcting these fundamental evils, and will place dental service in the army in a position where it can practically demonstrate its value and importance in maintaining the physical efficiency of our fighting men.

Another important result of the new order will be its reflex

effect upon dental educational activities in the immediate future. It is highly questionable whether the large additional number of army dental surgeons required by July next can all be drawn from the body of dental surgeons now in civil life. A fair proportion will be needed to care for the needs of the civilian population, and there are even now no more than a sufficient number for that purpose. The main reliance of the Government will therefore have to be upon the classes that will graduate at the close of the current session of the dental schools. And in order to secure a sufficient body of graduates to meet both army and civilian needs it seems inevitable that a considerable body of students will have to be recruited from the present draft quota and assigned to dental educational institutions, under army regulations, to pursue the dental course.

Such a correlation of military training and dental education under government regulation has much to recommend it as a disciplinary system both for the mind and for the body. Not the least of its advantages will be the opportunity that it will afford to substitute something really useful in the dental curriculum for that academic mongrel called "dental rhetoric," whatever that may be, which someone has apparently succeeded in impinging upon the standardized dental curriculum recently authorized by the Dental Educational Council of America.

We have endeavored herein to present merely the main elements of this important development, and will keep our readers informed regarding the detailed changes and regulations as they arise from the practical applications which the new order will necessarily involve.

Classification of Dental Schools.

The following is the formal classification of dental schools as adopted by the Dental Educational Council of America, at Chicago, Ill., July 31, 1918:

Class A.

Creighton University, College of Dentistry, Omaha, Nebraska.
Harvard Dental School, Boston, Mass.
Marquette University, College of Dentistry, Milwaukee, Wis.
Medical College of Virginia, School of Dentistry, Richmond, Va.

North Pacific Dental College, Portland, Oregon.
Ohio State University, College of Dentistry, Columbus, Ohio.
The Thomas W. Evans Museum and Dental Institute, University of Pennsylvania.
Tufts Dental College, Boston, Mass.
University of California, College of Dentistry, San Francisco, Cal.
University of Illinois, College of Dentistry, Chicago, Ill.
University of Iowa, College of Dentistry, Iowa City, Iowa.
University of Michigan, College of Dentistry, Ann Arbor, Mich.
University of Minnesota, College of Dentistry, Minneapolis, Minn.
University of Pittsburgh, College of Dentistry, Pittsburgh, Pa.
University of Southern California, College of Dentistry, Los Angeles.
Northwestern University, Dental School, Chicago, Ill.

Class B.

Colorado College of Dental Surgery, Denver, Colo.
Georgetown University, School of Dentistry, Washington, D. C.
Howard University, Dental School, Washington, D. C.
Atlanta-Southern Dental College, Atlanta, Georgia.
Louisville University, College of Dentistry, Louisville, Ky.
Chicago College of Dental Surgery, Chicago, Ill.
Indiana Dental College, Indianapolis, Indiana.
Loyola University, School of Dentistry, New Orleans, La.
Tulane University, School of Dentistry, New Orleans, La.
Baltimore College of Dental Surgery, Baltimore, Md.
University of Maryland, Dental Department, Baltimore, Md.
St. Louis University, College of Dentistry, St. Louis, Mo.
Washington University, Dental School, St. Louis, Mo.
Kansas City Dental College, Kansas City, Mo.
Western Dental College, Kansas City, Mo.
University of Buffalo, Dental Department, Buffalo, N. Y.
New York College of Dentistry, New York.
College of Dental and Oral Surgery of New York.
Western Reserve University, Dental School, Cleveland, Ohio.
Ohio College of Dental Surgery, Cincinnati, Ohio.
Philadelphia Dental College, Philadelphia, Pa.
Vanderbilt University, School of Dentistry, Nashville, Tenn.
University of Tennessee, College of Dentistry, Memphis, Tenn.
Meharry Dental College, Nashville, Tenn.
George Washington University, Dental School, Washington, D. C.
College of Physicians and Surgeons, Dental Dept., San Francisco, Cal.
Baylor University, Dental Department, Dallas, Texas.

Class C.

Lincoln Dental College, Lincoln, Nebraska.
College of Jersey City, N. J.
Cincinnati College of Dental Surgery, Cincinnati, Ohio.
Texas Dental College, Houston, Texas.

PRACTICAL HINTS

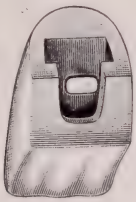
This Department specially welcomes the brief presentation by our readers of any novel suggestions or methods which in their own practice have proved to be time-saving or to possess other features of advantage.

Vulcolox Anteriors in the Construction of Richmond Crowns and Bridge Work.

By ADOLPH GROPPER, Milwaukee, Wis.

THE pin in the tooth is first given a one-half turn with narrow-beaked pliers so as to bring the longest line of the oblong head of the pin to a right angle with the long axis of the tooth, as shown in Fig. 1.

FIG. 1.



A piece of clasp-metal plate, 28 gage, is cut to the shape shown in Fig. 2; a slot is then cut in the center of one side as indicated, to engage the pin in the tooth. This clasp-metal plate is held with narrow-beaked pliers, and both ex-

FIG. 2.

FIG. 3.

tending ends are bent so as to closely fit the three-sided dovetail slot in the tooth, Fig. 3.

Backing material is burnished to the back of the tooth, extending to its gingival labial edge, and two slots are cut through the backing, Fig. 4, to receive the extending wings of the dovetail fitting, Fig 3.

The dovetail fitting, Fig. 3, is then adjusted into the slot of the tooth; the

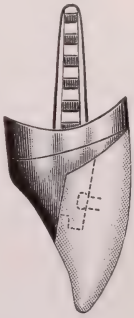
FIG. 4.

FIG. 5.

backing, Fig. 4, is burnished to place, and waxed to the dovetail fitting, Fig. 5. Remove, invest, and solder.

FIG. 6.

FIG. 7.



The backing is next adjusted and waxed to the cap as shown in Fig. 6, and soldered in the usual manner, completing the crown, Fig. 7.

141 WISCONSIN ST.

Review of Current Dental Literature

[*Lancet*, London, July 6, 1918.]

Operative Treatment of Trigeminal Neuralgia. By J. Hutchinson.

This article is of great interest in connection with that of Frazier (*Jl. A. M. A.*, May 11, 1918, and Dental Cosmos, September 1918, p. 829). Both surgeons agree that the only treatment affording lasting cure is an operation on the Gasserian ganglion. Hutchinson believes that the method of Frazier and Spiller (division of sensory root) is too hazardous and uncertain ever to come into favor; and moreover, it has the disadvantage of destroying the ophthalmic division. Primarily it is to save this division that Hutchinson devised his method. This is not only urgently desirable but is quite feasible, because in only 25 per cent. of cases of trigeminal neuralgia is the ophthalmic division materially involved.

The ganglion is removed by three lines of section: (1) Division of the inferior maxillary division at the foramen ovale; (2) division of the superior maxillary division at the foramen rotundum; and (3) a horizontal cut below the ophthalmic division, which is thus spared.

Of over sixty cases operated upon, only one has proved fatal, and in this the patient was a very bad risk. After removal of the ganglion, Hutchinson has followed up many cases for over ten years, some for nearly twenty years, and the neuralgia has not returned. This statement is true of the great majority, but there have been a few exceptions, difficult to explain. In only one case has the neuralgia returned—to be localized in the ophthalmic division, some ten years after operation. In this case resection of the supra-orbital nerve was a complete success for the period of observation (three years).

The complications sequent to Hutchinson's method are no other than those liable in any other operations. The results are among the most satisfactory of any the surgeon will encounter.

Hutchinson is very emphatic that *the extraction of teeth with the view of relieving or curing true epileptiform neuralgia is a pernicious and useless practice.* There exists in his opinion no valid evidence to regard trigeminal neuralgia as a spreading neuritis of dental origin.

In respect to alcohol injection, either of branches of the fifth nerve or into the foramen ovale and its neighborhood, Hutchinson is quite in accord with Frazier. To them it is but an indifferent substitute for operation on the Gasserian ganglion. Ocular and aural complications may result from alcoholic injection.

Cheatle (*Lancet*, London, July 13, 1918, p. 56) has seen two cases in which the middle ear has been badly and permanently disorganized, owing apparently to the alcohol entering the Eustachian tube.

[*Journal of Infectious Diseases*, Chicago, June 1918.]

Streptothrix Interproximalis—*nova sp.*: An Obligate Micro-aerophile from the Human Mouth. By Eric A. Fennel.

The mouths from which this organism was isolated would be classed as "habitually unclean mouths with incipient caries and a liberal deposit of salivary calculus." The culture medium used was Martin's agar and ascitic fluid, on which macroscopically visible colonies developed in four or five days. Cultivation was conducted under the system of partial oxygen tension of Wherry and Oliver.

The organism is highly pleomorphic, growing in plaque-like colonies of intertwined and matted threads. Its morphology varies rather consistently with the age of culture. It stains with the ordinary dyes. A majority of the threads are Gram-positive. It is non-motile;

optimum temperature 35° C.; it does not grow at all at 20° C. or under anaerobic conditions, and only with the greatest difficulty aerobically. It produces neither pigment nor endospores.

Fennel details the cultural characteristics at some length.

[*Le Progrès Médical*, Paris, May 18, 1918.]

Frequency of Vincent's Angina. By J. Chalier.

Before the war 2.26 per cent. of all cases of angina were due to Vincent's organisms. For twenty-two months Chalier was associated with the medical service to 2500 men. In his experience there occurred 46 cases of true angina, 13 (*i.e.* 28.26 per cent.) of which were of Vincent's type. In the latter months of his service there was a marked increase in the incidence of the disease.

On account of the possibility of contagion, it is advisable to isolate the patients for ten days. In from eight to twelve days, in cases receiving early treatment, cure has been complete. Successful results have been obtained from thorough washing out of the throat three times a day with 2 liters of boiled water to which a little H_2O_2 has been added. This is followed by a liberal application of powdered methylene blue to the craters of the ulcers.

T. J. Gallaher (*Laryngoscope*, St. Louis, July 1918, p. 551) has for a number of years been very successful in the treatment of Vincent's angina with trichloracetic acid. The pure liquid acid, after excess has been absorbed on an ordinary blotter, is applied carefully to the entire affected area by means of a small applicator wound with cotton. The parts turn white in two to three minutes. Then neutralize by applying a saturated solution of sodium bicarbonate. Repeat in two or three days if necessary. It is rarely necessary to make more than two applications.

[*Surgical Clinics of Chicago*, Philadelphia, June 1918.]

Tumor of the Gasserian Ganglion. By Nelson M. Percy.

This is a case history with commentary. The patient was a male, age thirty-one years; family and personal histories negative. Complained of pain in right forehead, right ear, and right side of the face, beginning about two years before being seen by Percy. Simple tic douloureux was eliminated because of the paralysis of the seventh cranial nerve; also because the pain became continuous soon after the beginning of the trouble and has persisted since, while in tic douloureux the pain is never so persistent, but is intermittent—in spasms. A probable diagnosis of tumor of the Gasserian ganglion was made.

The surgical technique of the removal of the tumor is detailed. The growth was 3.5 x 2.5 x 1. mm., was closely connected with and apparently included the ganglion. The nature of the growth is still in doubt. Diagnoses suggested by different pathologists were neurofibroma, fibrosarcoma, and endothelioma.

Convalescence was rapid and uneventful. The pain had stopped. The patient had not been seen since leaving the hospital.

[*American Journal of Syphilis*, St. Louis, April 1918.]

Leukoplakia of the Tongue. By Douglass W. Montgomery.

The case reported is of interest for several reasons: Because of its occurrence in a young man (age twenty-two years), because of its association with syphilis (contracted at the age of sixteen years), and because it almost entirely cleared up under the use of radium and anti-syphilitic treatment.

The patient denied the use of tobacco at any time or in any form. This is important, considering the usually and undoubtedly justly accepted view that one of the chief causes of leukoplakia is tobacco smoke.

The radium treatment was as follows: A dime-sized plaque containing 24.23 mg. of radium element, and screened with A 1.0.05, cotton, and rubber, was applied for ten minutes, and reapplied in ten days. Two days after this last application a rather severe and quite painful reaction was obtained. In two weeks the hyperkeratosis had entirely disappeared, leaving what appeared to be a slight scar.

The syphilis was treated with salvarsan intravenously and with intramuscular injections of gray oil. This extended over a period of ninety-five days. The tongue condition never entirely cleared up; there remained the opalescent haze and decided local sensitiveness.

[*Medical Record*, New York City, August 24, 1918.]

Relationship of Oral Sepsis to Systemic Disease, and Its Bearing on Treatment. By H. B. Anderson.

In preparation of this paper, Anderson studied 257 private cases, of which he has full histories, and which could be followed more closely and for a longer period than cases in hospital practice. These cases have been tabulated, noting the principal disease and also other morbid conditions from which the patients suffered at the time of consultation or during the course of their illness. Anderson concludes that it is characteristic of oral infections that, as a rule, they do not produce a single systemic lesion, but a group of allied conditions, not all being manifest at a time.

The author cautions against too hasty and sweeping generalizations. He urges that each suspected case be carefully and critically investigated, to determine if oral infection is responsible for or contributory to the symptoms. In his opinion, teeth should not be sacrificed on the advice of the physician. A competent and experienced dentist is best qualified to advise as to the applicability or limitations of dental treatment.

[*Indian Medical Gazette*, Calcutta, April 1918.]

Autogenous Oral Streptococcal Vaccines in the Treatment of Seventeen Cases of Sprue. By Leonard Rogers.

The author here reports a series of seventeen cases as unselected and as consecutive as possible which have presented during the last four years. The particular strain of streptococci was not identified in the great majority of cases. Cultures were made when the tongue or mouth presented soreness or even small ulcers, but success was sometimes obtained during a quiescence of oral symptoms.

The initial dosage was approximately 50 million, increasing to 200 million, at intervals at first of five days, ascending to ten days. In typical cases injections were continued three to six months.

The results of this vaccine treatment in cures and in marked improvement are strikingly superior to the results obtained by other methods. Rogers concludes that the data furnished in this report go far toward supporting the view that sprue is essentially a streptococcal infection, originating in the mouth and spreading down the intestinal canal.

The case histories afford very interesting and suggestive reading.

Within the body of this paper is a brief mention of two cases of diarrhea associated with pyorrhea alveolaris successfully treated with oral autogenous vaccines.

[*Lancet*, London, June 8, 1918.]

Methods of General Anesthesia in Facial Surgery. By R. Wade.

[*Journal of American Medical Association*, Chicago, July 20, 1918.]

Anesthesia and Antiseptics in Plastic Restoration of the Face and Mouth. By A. E. Rockey.

Wade has found that there are two main difficulties in anesthesia for operations on the face and lower jaw: (1) Maintenance of good airway, and (2) the difficulty of avoiding interference with aseptic technique and field of view of the surgeon.

From the anesthetist's point of view, plastic operations may be divided into two main groups, those in which blood finds its way into the air-passages and those in which it does not. The following table gives a list of the various types of operations, together with the method of administration considered suitable for each case. Where there are alternatives the first is preferable.

Types of operations: Methods of anesthetization.

Lip plastics. C., C.E. + O_2; sitting up, intratracheal. Oil-ether per rectum, sitting up.

Cheek plastics. (A) Involving oral cavity: Intratracheal. C. or C.E. + O_2; sitting up. Oil-ether per rectum, sitting up.

(B) Not involving oral cavity: C. or C.E. by Shipway's warm-ether apparatus.

Chin plastics: Intratracheal; Kahn's tube.

Jaw operations: (A) Wiring fractures; also (B) Bone-grafting: Oil-ether per rectum; sterile anesthetic.

(C) Either of above cases with jaws splinted together. Sterile anesthetic.

Extensive burns of face: Oil-ether per rectum.

Anesthetizing the patient in the sitting-up

position in cases in which the blood is likely to find its way into the mouth during the operation has been found to be very satisfactory. Out of nearly 300 cases there have been no bad after-effects or complications.

In connection with this subject, Lovett (*Lancet*, June 22, 1918, p. 885) advocates preliminary tracheotomy and anesthesia through a tracheotomy tube. Lovett has used this method several times in the worst types of jaw cases with comminution of the mandible, laceration of the soft parts, and when the field of operation includes the oral cavity.

Mortimer (*Lancet*, July 13, 1918, p. 56) believes that for such purposes laryngotomy is usually preferable to tracheotomy, because by the former operation dangers of aspiration of blood from the wound and of opening up the deeper tissues are avoided. Wade (*Lancet*, July 13, 1918, p. 56) likewise prefers preliminary laryngotomy to tracheotomy, especially where there is much oral sepsis.

Rockey has been impressed with the difficulties signalized by Wade. The failure of surgeons to adopt the principle of an aseptic field in oral surgery is due to the inappropriate methods of anesthesia in general use. Rockey would remedy this condition. Ether inhalation by mouth through a large pharyngeal tube and a coffer-dam of gauze packing, when properly placed, is superior to any other method in a very large class of oral operations. It furnishes that efficient block between the operative field and the respiratory tract so necessary for the performance of ideal operations in this region, and makes possible a degree of asepsis in the operation not possible by any other method.

The apparatus devised and used by Rockey is shown in the paper by illustrations.

It is essential that the ether be given by someone competent to maintain safely such a degree of anesthesia as will prevent any attempt at vomiting, which might clog or displace the tube and break the asepsis of the operating field.

To secure that asepsis the following is essential: (1) Preliminary careful cleaning of the mouth by a dental surgeon. (2) After the introduction of the pharyngeal tube of the inhaler, and the careful placing of the gauze pack, the operative field is cleansed and sterilized as it is in any other part of the body.

[*Surgery, Gynecology and Obstetrics*, Chicago, August 1918.]

Aberrant Thyroid Tumor of the Tongue. By Meyer A. Rabinowitz.

This is an elaboration of a case report of this rare type of tongue tumor. The author estimates the total number of cases which have been observed to date to be about 70. These growths occur most frequently between the ages of fifteen and forty-five; 90 per cent. of all cases have occurred in females. The tissue of the growth is derived from persistent remnants of the anlagen of the thyroid gland.

These tumors are usually situated medially on the dorsum of the tongue, just below and behind the foramen cecum, varying in size up to that of a small apple, and almost invariably encapsulated. Clinically, local inconvenience is rare and constitutional symptoms are usually absent. The prognosis is favorable. Treatment is either thyroid feeding or surgical removal. The best operation is incision, with enucleation.

[*Anatomical Record*, Philadelphia, July 20, 1918.]

The Use of Sandpaper in the Preparation of Histologic Ground Sections of Hard Substances. By J. I. Fanz.

Fanz found that by the introduction of sandpaper in ground-section technique the time required to obtain thin, complete, workable sections was reduced to about one-quarter.

The object is clamped in an ordinary carpenter's wood clamp or small vise, and a section 1 to 3 mm. thick removed by saw-cutting with a jeweler's saw. This coarse section is cemented with dry-scale orange shellac to one end of a rather thick microscopic slide. Within five minutes the shellac is set so that grinding can be begun.

Grinding is accomplished entirely on sandpaper of different grades of coarseness, and the section is never dipped in water or oil. Flint, sand, emery, or carborundum papers are selected according to the hardness of the material to be ground. The flint paper used was of the following grades, Nos. 2, 1, 00, or 0000. Sheets were cut into pieces 3 x 5 inches and were held over a smooth hardwood block 3 x 4 inches while grinding. Brittle substances (*e.g.* enamel) grind best

on No. 00, using a light touch. As soon as a paper becomes clogged or worn out it is discarded for a fresh piece. Old sheets are used in grinding prior to polishing. As soon as the first surface is ground true it must be finished on No. 0000. Two pieces of this grade are rubbed face to face to remove large particles before grinding the section thereon. Polishing is done on the smooth side of a piece of sandpaper, the paper pulp constituting the buffing surface. Final polishing can be performed on a piece of smooth ground-glass, on the palm of the hand or on a razor strop.

After grinding and polishing one surface, the section must be removed (dissolving the shellac in alcohol) and re-cemented prior to grinding and polishing its second surface.

After this the technique of mounting is the same as for ground sections prepared by any other method.

[*Laryngoscope*, St. Louis, February 1918.]

Macroglossia Lymphangioma, with Report of Case. By R. D. Sleight and W. Haughey.

The case was that of a girl, age six, of Polish birth. Family history was negative. The growth was first noticed at the age of six months, sequent to clipping the frenum linguæ. The tongue, which usually is soft to the touch and nearly normal in size, with a spreading, superficial growth, is subject to marked enlargement by exacerbations occurring at irregular intervals. These are too infrequent as yet to justify operation.

The principal value of this report is the general discussion of the condition and the references to the literature of the subject, for which the case report serves only as a text.

[*Medical Record*, New York City, June 1, 1918.]

True Pruritus Ani: Its Association with Pyorrhea Alveolaris. By E. Jay Clemons.

True pruritus ani is the percolation of infection from within the rectal mucosa into the loose subcutaneous tissue of the anal canal. The organism which is the etiological factor in this condition is a streptococcus. The nature of the organism leads Clemons to believe that the rectal mucosa is not the primary site of infection. This view is further confirmed to his satisfaction by the fact that in studying cases of true pruritus ani it is found that the patients are suffering from pyorrhea alveolaris.

Clemons failed to identify the streptococcal strain obtainable in the lesion. In other studies S. fecalis has been found. If this latter strain were proved to be the responsible agent, it would go far to exculpate the oral infection, because the streptococci of pyorrhetic pockets only rarely or never belong to the strain of S. fecalis.

[*Annals of Otology, Rhinology, and Laryngology*, St. Louis, December 1917.]

Dentigerous Cysts, with Report of Case. By Ira Frank.

The case is that of a boy, age twelve and one-half, in whom there was first noticed at the age of six a swelling of the left maxilla just beneath the naso-labial fold. The growth was never painful; it increased slowly in size until at the time of presentation it equaled that of a small plum. The left second incisor, canine, and premolars had never erupted. The overlying mucosa was normal, and there was no glandular involvement. Palpation revealed a parchment-like crepitation. A radiograph distinctly showed a cyst with three of the missing teeth. Upon removal the cyst was found to be 3 x 3 x 2 cm. in size. Its outer wall was whitish and smooth, its inner surface pink. The wall was 3 mm. thick. Three rather small but well-formed teeth were found. The microscopic picture was typical, and showed evidence of acute and subacute inflammation.

[*Annals of Surgery*, Philadelphia, July 1918.]

Fibrin Paper as a Hemostatic Agent. By Samuel Clark Harvey.

Tissues and tissue products have proved themselves in recent years to be most efficient in stopping bleeding from multiple small vessels, from vessels in delicate tissue, and from sinuses. The peculiar advantage in the use of these tissues is that they, being absorbable, can be left within or upon the wound, thereby avoiding the danger of stripping off the coagulum.

In the present contribution, Harvey describes a method [for details, see original] for converting the fibrin of beef blood into a fabric easily kept, sterilized, and applied.

This fabric is found to correspond in effectiveness and amenability to absorption with the untreated fibrin, while being far more adaptable to the operating room technique. In dental practice this agent would lend itself easily wherever a hemostatic was indicated, *e.g.* the moistened and softened "paper" could be packed under compress into a persistently bleeding tooth socket, and left there to be absorbed without further trouble.

PERISCOPE

Silver Nitrate in Root-canals.—We are being taught to deposit silver, from ammonia-treated silver nitrate, in root-canals by using formalin. Since experiments have probably shown that in electric ionization we drive our ions into and not through the root tissue, it occurred to me that this was the best way to deposit the silver in the root tissue, and experiments in practice seem to fully justify this treatment. Use a silver wire electrode. —F. D. PRICE, *Oral Health.*

To Measure the Circumference of a Tooth for a Gold Band.—Run a copper or aluminum wire through the rolls to make a very thin ribbon, or use the flat aluminum wire used in wireless work, but rolled thinner and annealed. It can be passed around the tooth and easily slips under the gum margin if desired, and may be pinched with the tweezers, as we make orthodontia bands. The correct measure of the circumference of a tooth or root can be obtained in this way quicker than the wire can be adjusted in the dentimeter.—F. D. PRICE, *Oral Health.*

Aid for Shoulder Crown Technique.—When adapting the gold base or fitting upon which the wax contour is to be developed, we frequently have trouble in making a good adaptation. This difficulty may be overcome by looping a gold wire around the upper axial third of the fitting. Twist it up tightly and then drive it down to the shoulder in a similar manner to the method employed for driving a hoop on a barrel. This wire loop will give a perfect and snug-fitting cap. If the wire is of 22-k. or 24-k. gold it may be left *in situ* while the crown is being developed, and finished in the usual manner.—F. W. FRAHM, *Pacific Dental Gazette.*

Sphagnum Moss as a Surgical Dressing.—Sphagnum moss is being extensively collected in England and her colonies for use as a surgical dressing. A number of eminent English surgeons and the army medical service have indorsed its use in the present emergency, and one eminent surgeon has declared that sphagnum dressing is superior to any cotton dressing, and that it has better absorbent qualities.

A number of the pharmacists, especially those in certain sections of Scotland, have aided in this service, and their botanical knowledge was highly useful in this connection.

It is stated that all that is necessary is to collect the moss, dry it in convenient clean places, and pack it in bags. Sphagnum moss grows so extensively in the marshes, bogs, and wet places throughout a very large portion of the United States that its value as a surgical dressing or packing and for other war purposes where cotton, oakum, or similar materials are now being used should be determined, and this problem is well worth the investigation of Red Cross and army medical authorities. If its usefulness for such purposes can be established, an endless supply is available at a normal cost.—EDIT., *Amer. Journ. of Pharmacy.*

Sterilization of Local Anesthetics.—A simple but effective method of preparing a sterile solution of cocain or other local anesthetic which may also contain epinephrin chlorid is described by Macnaughton-Jones. It consists in preparing a solution of sodium chlorid together with the anesthetic or anesthetics and epinephrin chorid, each constituent being present in such quantity that a dilution with many (for instance, forty) times the volume of water will give a solu-

tion containing the requisite percentage of each. The preparation is placed in a sealed phial or ampule and kept until required. Sterile water is added immediately before injection. Experiments demonstrate that even if the preparation be inoculated with the ordinary forms of bacterial contamination, the presence of concentrated salt renders it sterile in a few days. A simple method of preparing the concentrated solution is to take the quantities of anesthetic, salt, etc., required per 1000 and dissolve in water, but make up to 25 instead of to 1000. The concentrated solution which Macnaughton-Jones prepared contains procain 3.25 (13 per cent.), sodium chlorid 3.25 (13 per cent.), epinephrin chlorid solution (1 in 1000) 8.0 (32 per cent.), water by weight (or metric), add 25.0 (100). If a 2 in 1000 (0.2 per cent.) solution of cocain be desired, the formula would be modified as follows: The osmotic pressure of such a solution is only equal to that of a 0.35–1000 sodium chlorid, and consequently about 3.65–1000 of this salt is added, but inasmuch as cocain produces anemia the epinephrin may be reduced if desired. The concentrated solution: Cocain hydrochlorid 2.0 (8 per cent.), sodium chlorid (approximately) 3.75 (15 per cent.), epinephrin chlorid (1 in 1000) 6.0 (24 per cent.), water by weight to 25.0 (100).—*Journ. Amer. Med. Association.*

Gold Foil Fillings.—What do we seek to accomplish in the operation of filling a tooth? Is not the primary object to stop the progress of decay toward the dental pulp, and save its life? To preserve it in its health? To immunize the tooth surfaces? To restore the tooth to its original form and function, and to protect the investing tissues? If this then is our duty, I ask what material has time proved to be first in accomplishing these results? With the rubber dam in place, the cavity is prepared under dry conditions, with less pain, and we know we secure a superior cavity. We know when we fill that cavity with gold foil, fresh from the flame, we are using a sterile material, and we have had demonstrated for forty years the immunity of those fillings by men who have gone before us. When properly performed, these operations have stood the test of time, first in order of all the filling materials. I plead with you, do not let the meteor going through the heavens hide from view the stars of the first magnitude. Do not let the inlay draw your attention away from the technique of gold foil, because in the average number of cases I believe we know and can prove that gold foil can be not only better adapted to those cavity walls, but quicker. It is foolishness to discuss which is the quicker. That is not what we are after. Which is the better? What is the material with which we may use to our great advantage the elasticity of the dentin, and place in the cavity a filling which the dentin will grip continuously and hold there secure against moisture and bacterial invasion? Only one material—gold foil. Somebody said it was "so difficult to use." I challenge that statement. It is difficult because we have not studied it; it is difficult because we do not comprehend the facts entering into the operation. Five or six things are necessary, we are told, in securing a good inlay—temperature, change in volume of materials used, etc. The operator in gold foil may secure absolute adaptation of the material to sterile cavity walls and eliminate all chances, in one operation. Where gold foil is indicated let us use it honestly, carefully, and scientifically. It will then demonstrate its wonderful possibilities.—J. M. PRIME, *Journ. N. D. A.*

Synthetic Technique.—Prepare the cavity as for a gold filling, with square margins and no bevels whatever. Chill the slab to a temperature of about 65° to 70° F. and wipe the slab and spatula with grain alcohol. Have ready instruments of tantalum, ivory or agate—always an agate spatula—celluloid matrix strip, pliers, and cocoa butter. Next dry out the cavity with alcohol, and wherever feasible, especially when deep, line the cavity with Caulk's cavity lining; then adjust the celluloid matrix.

Place the powder and liquid on the slab, taking out about twice the amount of powder as of liquid. Mix promptly on exposure on the slab, that is, complete the mixing within a minute and a half. This is easily accomplished if a large quantity of powder is introduced into the liquid and spatulated only enough to saturate it, followed with successive small quantities until the mass is just past the point where it is wet, but is still plastic.

With the celluloid matrix strip in position, introduce the synthetic cement into the cavity, working it well into the undercuts and against the cavity walls. Fill the cavity with slight excess, bring the celluloid matrix strip around the filling and hold it stationary for 3½ minutes by the watch, with a firm pressure but without burnishing. At the expiration of 3½ minutes the strip will release itself. Immediately coat the filling with cocoa butter to exclude the air, and allow it to stand undisturbed for ten or fifteen minutes, accord-

ing to the size of the filling; then dress down with abrasives carrying cocoa butter.

In approximal cavities it is permissible to use bud-shaped, fine grit, clean carborundum points carrying cocoa butter on the lingual surfaces, where they are inaccessible to disks and strips. Follow with fine-grit sandpaper disks and strips, and finish with finest cuttlefish disks and strips, always carrying cocoa butter. It will be found that a better color and finish will be obtained if the final finishing is deferred until a subsequent sitting. Before removing the dam, wipe off the cocoa butter with dry cotton, and immediately coat the filling with varnish. Do not use a varnish containing alcohol, as it will dehydrate and change the color of the filling.—GEO. D. SMITH, *American Dentist.*

Chlorin Antiseptics.—The antiseptics of the chlorin group which are most commonly employed in the treatment of infected wounds are the following: (1) Hypochlorous acid and its sodium and other salts, including Dakin's solution. (2) Chlorazene (chloramin-T), the abbreviated name for sodium-toluene-sulfon-chloramid, which is employed in an aqueous solution. (3) Dichloramin-T, the abbreviated name for toluene-sulfon-dichloramin, which is used only in an oily solution.

In most respects, the action of the various chlorin compounds is essentially similar, though each possesses certain properties which render it more or less suitable for particular purposes. As a matter of convenience, it may be desirable to give a short *résumé* of these considerations, the results of which are mostly taken from the experiences of Dakin, Carrel, Dunham, Lee, and others, as well as our experiences at the West Side Hospital.

(1) Hypochlorous acid and hypochlorites are best suited to cleansing septic wounds by irrigation. They markedly assist in the dissolution of necrosed tissue; they are unstable and very reactive, and must be renewed frequently in all parts of the wound, this being best accomplished by an intermittent method of instillation. But the complexity of the apparatus necessary to obtain the ideal result, that is, by frequently renewing the antiseptic, makes this method quite cumbersome.

(2) Chlorazene (chloramin-T), used in aqueous solution, is more stable, exerts more prolonged antiseptic action, and is considerably more effective than the hypochlorite when acting in the presence of blood. For details concerning the preparation of solutions of the hypochlorites and chlorazene, we refer to the publications of Dakin and Carrel.

(3) Dichloramin-T dissolved in a special oily solvent may be sprayed upon wound surfaces or poured into accessible parts of deep wounds. It yields moderate amounts of the antiseptic to watery media such as the secretion from wounds or mucous membranes, but yields much greater amounts when used on dry surfaces. It is suitable for cases requiring prolonged antiseptic treatment and for first dressings of recent wounds which do not require irrigation. It is also used for nasal and oral and for ocular antisepsis.

By reason of its availability in oily solution, dichloramin-T has a great advantage over the other chlorin antiseptics in that it may be used in high concentration, and its action is of much longer duration. The application of the oil is extremely simple, and it ordinarily need not be renewed more than once in twenty-four hours.—L. I. MILLER, *Amer. Journ. of Clin. Medicine.*

OBITUARY

Dr. George A. Maxfield.

[SEE FRONTISPIECE.]

DIED, Tuesday, July 30, 1918, in his seventieth year, at his home in Holyoke, Mass., after an illness of several weeks, GEORGE ARTHUR MAXFIELD, D.D.S.

Dr. Maxfield was born at Chicopee Falls, Mass., October 29, 1848, the son of Arthur L. and Orrissa (Anderson) Maxfield. Dr. Maxfield's father was a prominent cotton goods manufacturer of New England, and removed from Merrimac, Mass., to Holyoke in the year 1854.

Dr. Maxfield received his early education in the public schools of Holyoke, and in 1879 entered the University of Pennsylvania, de-

partment of dentistry, from which institution he received the D.D.S. degree in 1881. Immediately after his graduation Dr. Maxfield opened an office in Chester, Pa., where he practiced dentistry for two years. In 1883 he returned to Holyoke, where he established himself in the practice of his profession, remaining there until the time of his death.

Dr. Maxfield was conspicuously successful in practice, especially as a consulting dentist in the diagnosis and treatment of unusual and obscure oral diseases. Dr. Maxfield was for years a leading citizen of Holyoke, always interested in every movement which concerned the betterment and uplift of the community. He was an active member of the Second Baptist Church of Holyoke, which he served as clerk for many years.

Dr. Maxfield was long and favorably known as one of the most active and enthusiastic dentists of his district. He was closely associated with every development of the dental profession in the Connecticut Valley, and was particularly active and influential in the Massachusetts State Dental Society. His conscientious endeavor was always for the elevation of the standard of dentistry by his influence and efforts in the various dental societies with which he was connected. He was particularly interested in the younger men of the profession, and was always willing and anxious to lend them a helping hand. He was for eleven years secretary of the Connecticut Valley Dental Society, in which society he continued his activity when it was merged with the New England Dental Society, and later into the present Northeastern Dental Association. He was president of the Massachusetts Dental Society in 1895, and as vice-president of the society the previous year he was one of three members who planned the reorganization of the state society into seven districts, and helped to draft the constitution and by-laws for the reorganized society.

He was appointed a member of the Board of Registration in Dentistry in 1897 by Governor Roger Walcott, and served on that board for fourteen years, retiring in May 1913.

Dr. Maxfield was typical of New England manhood. He was a staunch supporter of the dental law, and, together with those associated with him, was responsible for the high standard which dentistry has attained in New England, and particularly in Massachusetts.

He was a frequent contributor to the dental literature, and also the inventor of several useful dental appliances. He was the joint inventor with Dr. Newton Morgan of the well-known Morgan-Maxfield disk mandrel, which has for many years been one of the standard dental appliances used by dentists throughout the country.

In addition to the societies already mentioned he was a member of the National Dental Association, and honorary member of the New Hampshire, Vermont, and Connecticut State Dental Societies.

Dr. Maxfield was married in 1871 to Miss Elizabeth R. Bennett of Holyoke, who died in 1882. In 1885 he married Miss Martha H. Currier of Holyoke, who survives him. His remains were interred in the city cemetery of Holyoke, Friday, August 2d.

Dr. Lloyd Allen Osborn.

Died, Tuesday, July 24, 1918, at Fremont, Iowa, from drowning, Lloyd Allen Osborn, D.D.S.

Dr. Osborn was born August 13, 1890, at Stuart, Iowa, the son of William T. and Mary Osborn. Dr. Osborn obtained his early education in the high school at Valley Junction, Iowa, and later attended Drake University at Des Moines, Iowa. He entered the State University of Iowa dental department in 1912, and was graduated from that institution in 1915. He immediately opened an office in Fremont, Iowa, where he practiced his profession until the time of his sad death.

Dr. Osborn held a commission as 1st lieutenant in the Dental Reserve Corps of the United States army, and was expecting a call into the service when death overtook him. He was active in religious work, and was a regular attendant of the Presbyterian Church in Fremont. At one time he was a teacher of a class of boys in sunday-school, and later became interested in the boy-scout movement. He became a scoutmaster, and organized a troop at Fremont. He was on a scouting expedition with his troop on the river near Fremont, and was attempting to save one of the boys of his troop who had accidentally fallen into the swiftly moving current of the river when he lost his life, sacrificing it in

an unselfish and heroic endeavor to rescue one of his youthful companions.

Dr. Osborn was a member of the Iowa Dental Society. He was married May 29, 1918, to Miss Eva Allen of Sioux City, Iowa, who, with his mother, father, and sister, survives him. His remains were interred at Valley Junction, Iowa, July 23d.

DENTAL COLLEGE COMMENCEMENTS

University of Iowa, College of Dentistry.

At the annual commencement exercises of the College of Dentistry of the State University of Iowa, held June 12, 1918, in Iowa City, Iowa, the degree of Doctor of Dental Surgery was conferred on the following graduates:

C. Ray Abbott	Iowa
William E. Balmat	South Dakota
Van F. Barnes	Nebraska
Rex W. Barstow	Idaho
H. Berner	Iowa
H. Jay Bonifield	Iowa
E. Tennyson Boyd	South Dakota
Kenneth Bryant	Montana
Herbert F. Buchanan	Iowa
Yasaku Chikaraishi	Iowa
A. Aron Cristenson	Iowa
Archie B. Copeman	Iowa
Thomas S. Cunningham	Iowa
Paul Danforth	South Dakota
Wesley C. Darby	Iowa
Plumber L. Egert	Iowa
Nelson R. Ellsworth	Iowa
O. S. Fatland	Iowa
H. Ward Fonda	Iowa
Simon A. Foss	Iowa
Roy C. Gillett	Iowa
Edwin E. Goss	Iowa
Clifford D. Grant	Iowa
Earl G. Harbison	Iowa
Mary T. Hasley	Iowa
Eva R. Hastings	Iowa
Mayo D. Heston	Nebraska
Leo A. Hollingshead	Iowa
Kenneth B. Hoyne	Iowa
William F. Hruska	Iowa
Eugene T. Hubbard	Iowa
Samuel P. Johnston	Iowa
William G. Joor	Iowa
John W. Kelly	Iowa
Leo J. Kelly	Iowa
Floyd L. Kinseth	Iowa
Harold B. Kremer	Minnesota
Curtis Layton	Iowa
Roy E. Leidigh	Iowa
Basil J. Lewis	Iowa
Malcolm D. McMichael	Iowa
J. L. Magennis	Iowa
Roy C. Mason	Iowa
Willard O. Mauch	Iowa
Cecil S. Maytum	South Dakota
Glen G. Meier	Iowa
Bert W. Newton	Iowa
Lee C. Nugent	Iowa
Harry E. Parsons	Iowa
Walter H. Paule	Iowa
Dean H. Phelps	Iowa
Harold E. Pilcher	Iowa
Bert C. Puckett	Iowa
Albert J. Redding	Iowa
Ted W. Reynolds	Iowa
Malvin Romans	Iowa
George H. Ruwe	Iowa
Charles G. Sanner	Iowa
Robert E. Savage	Iowa
Arnold C. Schoenthaler	Iowa
Cecil C. Schreiber	Iowa
Edwin M. Stanton	Iowa
Marion C. Staves	Iowa
Walter L. Stocks	Iowa
Rex R. Stoner	Iowa
William J. Strane	Iowa
Charles G. Taylor	Iowa
J. Frederick Walter	Iowa
Irving J. Weber	Iowa
V. J. Whitney	South Dakota
James H. Wick	Iowa
Kenneth E. Williams	Iowa
William D. Wilson	Iowa
Willis H. Withee	South Dakota
Henry D. Wold	Iowa
C. M. Woodard	Iowa
Charles F. Wratislaw	Iowa

Army and Navy Dental News

Twelve Months with British Prisoners of War.

By W. J. Law, L.D.S.Eng.

When Mr. Woods decided to go out to Switzerland for two months to undertake the dental treatment of our prisoners of war interned there, the North Midland Branch decided that the work thus begun should, if possible, be continued, and for this purpose opened a subscription list, which was liberally responded to. Mr. Woods' two months lengthened to six, and the good work he did created a demand for a similar service at the other main center of Switzerland. So plans were altered, and after the usual War Office delay, permission was given to send out another dentist to Chateau d'Oex. The scheme met with the enthusiastic and wholehearted support of Sir Arthur Stanley and the Council of the British Red Cross, who made a very liberal donation to the funds, while at the same time giving the branch committee complete liberty of action.

Early in April 1917, then, I was asked to undertake the work, and came up to London on a begging expedition. Never had beggar an easier task! On all hands the dental firms gave and lent and reduced prices with the greatest generosity and readiness. Messrs. de Trey alone offered all they could to completely equip the work, free of cost, and are constantly begging among their American friends for more! Messrs. Ash lent a chair and electric engine free of cost. Messrs. Parke-Davis, "Kolynos," Courtin, and others were equally generous, and only in one case was any refusal made.

The end of the month found my wife and me on the deck of the steamer, Red Cross armlets on our sleeves, some three to four hundredweight of luggage in the hold, on our way to Switzerland. The tedious journey of three days was greatly ameliorated by the Red Cross arrangements. At all places they gave constant help, provided hotel accommodation in Paris, dealt with baggage, booked seats on the trains, and did everything possible to minimize discomfort.

AT LEYSIN.

Arrived in Switzerland, we were first of all sent to the tuberculosis center and sanatorium of Leysin, situated 4000 feet above sea level, overlooking the Rhône valley; with the Dent du Midi opposite, it was indeed an ideal spot, "where every prospect pleased, but," alas! "only man was vile!" For its whole population is a victim to one form or other of the dread bacillus. Balconied sanatoriums rise one above another almost to the sky line! Here the famous sun-cure establishments of Dr. Rollier for joints, spines, etc., and there the other establishments for lungs! Every inhabitant, from the shopkeeper to the chambermaid, was ill, and every nationality seemed to be represented in the village. French, Swiss, Greeks, Italians, Serbs, Roumanians, Poles, Russians, Belgians, and even Siamese, were all in our hotel; while, of the prisoners, we had Belgians, French with their Colonials, Arabs in gorgeous red and blue uniforms, with marvelous gold embroidery, turbans, and fezzes. Our own British Tommies, Colonials, and Indians, in their khaki, relieved only by Scotch bonnets, formed a sober background. Among our twenty-seven Indians, who lived in a separate chalet, killed and cooked their own food, fourteen different tribes were represented, and weird and wonderful were the quarrels that ensued in as many different dialects. A rather depressing prospect at first, tempered in the end by the knowledge that in the wonderful restorative properties of the Alpine air and sunshine, men, broken in prison camps of Germany, had more than an even chance of restoration to health and usefulness.

Swiss railways and habits do not, to say the least, hustle; but at last all was ready. An ideal surgery in the main hotel was put at our disposal, with a polished oilcloth floor. A light and wide balcony, overlooking the valley, equipped with pump chair, electric engine, fountain spittoon, and an abundance of hot and cold water, made admirable working conditions. Treatment was entirely free and voluntary, and soon patients swarmed in. In a very short time dentistry became the

fashion, and the amount done to each patient a subject for eager discussion among them. Ribald parodies appeared at the "Hut" concerts, and a lecture on "Teeth, and How to Take Care of Them" sent up the price of apples at the next-door greengrocer's.

The men themselves were an epitome of the war. As they told their stories, half-forgotten incidents of, it seemed, ages ago came back to living memory. Here were Lancashire Fusiliers taken on the first day at Mons; Connaught Rangers "left behind" on the famous retreat; men of the Marne and Aisne. My own orderly, a Royal Scottish Fusilier of twenty-one years' service, came straight from India, and, as part of the immortal 7th Division, was captured at the first battle of Ypres; men of the new army picked up after Loos; Canadians from the second battle of Ypres; Irishmen flattered and favored until they refused to betray their salt when cajoled by the visionary and traitor Casement at Limburg, then starved and buffeted in all kinds of fiendish methods for their loyalty; men who had lived through the horrors of Wittenburg and many another equally vile but less well-known camp, all cheery, all difficult to convince that rest, fresh air, and sunshine had anything at all to do with their cure, but with the conviction that the worst crime in the calendar was to be dirty or slovenly in person or dress, and that the next was to work for the Germans, and that the main duty of life was to annoy and impede their captors in every way possible.

Dentally, of course, the large majority were in a bad way. We, who know the almost entire lack of dental attention which was characteristic of our old army system, will not be surprised at this. Treatment in the large majority of cases had to be radical. Nitrous oxid is almost, if not quite, unknown in Switzerland; so local anesthetics had to be resorted to in every case that it was safe or possible to do so. Conservative work consisted chiefly of plastic fillings and porcelain crowns. No coal-gas is to be had in these mountain resorts, so soldering was almost impossible, and pivot or gold-shell crowns rather difficult to do. Some few, in cases where nothing else was possible, were set up and sent to a laboratory at Zurich to be finished. A similar procedure made the finishing of dentures possible.

Pyorrhea was conspicuous by its rarity. Teeth were dirty, a large number of men had gingival tartar in the upper as well as the lower jaw, but, contrary to civilian experience—which is that pyorrhea is almost always an accompaniment of tuberculosis—few real pockets were found.

AT CHATEAU D'OEX.

Extractions and fillings finished, together with some dentures, we moved on to the much larger camp of Chateau d'Oex. Here were some 750 men and officers disabled and ill in various ways. Accommodation was difficult to obtain, the hotels being full, and only built for holiday purposes. But at last we found two rooms on the ground floor of a large old chalet which had been used by a dentist formerly, and so had water and a basin already fitted. Here, with a little furniture and floor covering, we soon were once more installed, and work, as before, began to pour in. Hardly had we begun, when the long and eagerly talked-of repatriation became a reality. The Commission actually arrived, and men passed for home began to wear the real Blighty smile—the sort that do what you will won't come off, and is worn sleeping or waking, at work or at play. Much running to and fro ensued; all the dentures at Leysin had to be finished, some of them at and up to the last minute. The great day arrived—one denture had to be adjusted in the train—even as a parting benediction one tooth was extracted in that same train, and amid scenes of great excitement 250 left for Old England once more, cheered by large crowds all the way along the line, even at Geneva, at 3 o'clock in the morning. Once more work settled down again into its usual routine, and our thought turned to the new arrivals. When would they come, and what would be their condition when they did arrive?

Late in November the first party turned up. Much to our relief they seemed in much better physical and mental condition than the first parties, though the dark blue, almost black, uniforms supplied by the home authorities, to which the Germans had thoughtfully added stripes and patches of yellow cotton, to render escape more difficult—in some cases even cutting the cloth away and inserting the patch bodily in the suit—made anything but a pleasing picture. However, suits of khaki soon altered this, and the sun gave a tan and color to pasty faces, which at once improved 50 per cent. of the men, in appearance at any rate. Another batch arrived late in December—too late for Christmas Day, alas!—and their condition was much worse than that of their predecessors, though the same remarks apply. One interesting thing was that they had been in Mannheim on Christmas Day, and had seen and cheered like mad the British aeroplanes which gave that city a very unwelcome Christmas present. Among them, too, were our first

civilian prisoners of war; we had had several naval men, and now we had men of our not less gallant mercantile marine. More than one of these were veterans of over seventy—there seems to be, apparently, no age limit on the sea—and of their cheerfulness, optimism, and patriotism, no praise can be too warm. A piece of work which I think gave me more satisfaction than any other that I have done out here was to replace a full upper and lower set for one of these men; his own had been lost during his three hours' immersion in the sea after the torpedoing of his vessel, and he had steadily refused to have them replaced in Germany because it was helping the enemy. Since the great first repatriation others have followed at intervals of, roughly, three months, and the places vacant are being filled up with fresh men from Germany; so a constant stream of new faces and fresh work runs past us.

EFFECTS OF THE INJURIES UPON THE MEN.

What of the men themselves? Slowly and reluctantly one has come to the conclusion that none, or hardly any, can be called normal. Whether they will ever be so again is to be doubted. Behind them lies a land of ghastly horror. The door has been shut, it is true, but the memory remains an ever-present nightmare. Rarely, and only with the most reluctance will they speak of it. They want to forget, but they cannot. Any and every recital of actual, and even supposed, horrors cannot reproduce the actual atmosphere of dumb and intolerable suffering, from which, as by a miracle, they have come out alive; and the impression of it on their lives is indelible. They are scorched and branded as with a red-hot iron. Wounds may heal, physical disabilities they get used to, but the mental disability remains. And yet they make one proud of one's native land. With all their temptations real crime is rare. Such disturbance as occurs is mainly due to an excess of the native spirits, raw and fiery. Immorality, so far as we can tell, is almost *nil*. The Swiss are a moral people, but every Swiss girl loves the British soldier, and so the fact is the more remarkable. I have already mentioned their cleanliness, and one can add to this their pride in, and care of, the rooms they inhabit. Almost every bedroom is decorated with cards and photographs; few are they from which flowers are absent in spring and summer, and the managers of the best and most expensive hotels in the region are glad to have the British as their guests. The worst thing was lack of occupation. Lately something has been done to remedy this. Classes in woodwork, metalwork, motor driving, repair leatherwork, etc., have been opened, and here a large farm has been taken and planted with potatoes and vegetables; toys designed and made by the men themselves have had a ready sale, and basket-making and fancy needlework have been taught to the men in hospital, but it is difficult to find suitable work for all.

ATTITUDE OF THE SWISS.

Lastly, what about the Swiss attitude to us all? It must be borne in mind that Switzerland is a federation of many cantons, some French, some German, and some Italian-speaking. While the French-speaking are very pro-Entente, as a rule, it by no means follows that the German side is wholly sympathetic to Germany—far from it. In the second place, when the first arrangements were made, food was plentiful, whereas now it is getting very scarce, owing to the increasing shortage of shipping. Our bread ration is the smallest in Europe, save Holland, I believe, and living costs more than twice what it does in England. But, even with these drawbacks, my own personal experience has been nothing but favorable. The mere fact that I am allowed to do the work, though I have no Swiss qualification, is proof of that. Doctors and officials make things easy, and an appointment with the dentist overrides any other. Our Swiss *confrères*, far from looking upon us as interlopers, have constantly offered to do anything in their power to help our work.—*British Dental Journal.*

Federal Vocational Education.

THE federal board of vocational education is proceeding vigorously with its work in connection with the re-education of disabled men of the military services and their return to civil employment. This task was unanimously delegated to the board by Congress in the "Smith-Sears act" of April 6, 1918. This means much to these men who have suffered impairment of their earning capacities. The re-education and subsequent placement in civil life will in nowise affect the compensation the men will receive on account of disabilities from the war-risk insurance bureau. Coordination with other departments of the Government will be necessary to secure a smooth working plan. The three duties laid upon the board by law relative to the disabled men are: (1) Advisement, to ascertain what the man may want to train for, and to guide him into that vocation best suited to his capabilities, and which offers most substantial

expectations of steady and remunerative employment; (2) Training, by which, after his aim is fixed and decided, he is made efficient in that trade or profession; and (3) Placement, which graduates him out of the student and into the wage-earning or self-sustaining class, the latter made possible by the re-education he has received. The advisement will begin in the hospital in closest harmony with the military authorities, and at the earliest possible moment, so that any exercise or occupations given the patients for their therapeutic or curative value may, when possible, be a process in the scheme of re-education, and have a double and practical purpose aside from their well-recognized place as restorative media. The federal board must either establish its own schools for the work of rehabilitation or make arrangements with public and private schools throughout the country to carry on approved courses of instruction for these disabled men, the entire cost to be borne by the national Government. —*Army and Navy Register.*

The New Zealand Army Dental Service.

THE High Commissioner of New Zealand has issued an article, compiled by Mr. Malcolm Ross, describing the work of the Dental Corps of the New Zealand Army. Mr. Ross says:

It was in August 1915 that the New Zealanders started, at Cape Helles, the first dental hospital known in British warfare. It was established in a marquee on the cliffs above the Lancashire Landing by an officer who is still with us in France. There were two operators and six mechanics, the latter drawn from men in the famous 29th Division, several of them with degrees, but who were drawing only one shilling a day. Generals and other officers coming down from the front used to look in and express their astonishment at the establishment of a dental hospital in the war zone.

At the present moment the New Zealand dentists are working harder than ever, and saving to the army many a man who would otherwise become at least temporarily unfit for active service. Preliminary work was done in New Zealand before the force sailed, more was done on the troopships during the long voyage; still more in Egypt, while the work accomplished in the early days on Gallipoli undoubtedly kept hundreds of men in the firing line a time when men were sorely needed.

It has already been published in England that the teeth of the Mediterranean Expeditionary Force that landed at the same time as we did on the peninsula were often in an unsatisfactory condition. Indeed, the position was considered so serious that the British Surgeon-general approached the G.O.C. of the New Zealand Force for a loan of several of its dental officers, which loan was readily granted. The Australians also were without dentists, and in their case, again, New Zealand supplied the want.

Since then there has been a general advance in army dentistry, and the English, as well as the Australians and the Canadians, have well-equipped dental corps, but New Zealand still leads, inasmuch as it is the only country along the entire Allied front that has a dental hospital in the field, or, in other words, in the divisional area. The Germans, with their usual thoroughness, have their dental surgeons close up, and, as the result of always having recognized the necessity for an efficient dental service, the condition of the teeth of their troops leaves little to be desired.

The general practice adopted by us is a system of conservative dentistry, with the object of keeping the troops medically fit during the period of the war, the work being expeditiously performed, so that both officers and men may be returned to their units without delay. So far as New Zealand is concerned, there is what may be termed a complete dental chain. To begin with, there is provision for dental treatment in the training camps in the Dominion. On arrival in the United Kingdom they are again examined by the dental corps at the reserve group, and if necessary they receive further treatment until they can be certified fit to proceed to France. At the base depot in France there is another dental section, while with the division in the field there is a fully equipped dental hospital. Beyond this, in the forward areas, there is further provision for dental treatment.

But the system does not end here, for by a wise provision the soldiers who are no longer fit for service have their mouths made normal by the dental corps before they are discharged in New Zealand. This, as has been pointed out by the director, will have a very valuable effect on the nation in the next decade, since it gives the opportunity to the profession of combating dental caries among a class hitherto almost unapproachable.

From September 1914 to the end of January of the present year the number of extractions reached the large total of 57,257, the number of fillings 73,066, root-fillings 8324, minor operations 23,614, dentures 21,565, repairs 15,212. The number of patients treated reached a total of 114,677.—*British Dental Journal.*

Slackers Wanting Teeth Pulled!

According to the Provost Marshal-general the department of Justice has turned over to that office information which it has received tending to show that registrants in certain localities desiring to avoid military service have sought to have teeth extracted so as to render them subject to physical disqualification. A dentist in New York State advises that several would-be slackers have approached him with requests to have teeth extracted for this purpose. The Provost Marshal-general desires to warn all dentists against permitting themselves to be a party to practices of this sort, and to call attention to the fact that severe penalties are provided in the law for any person conspiring to aid another to avoid the draft.—*Army and Navy Register.*

Sixty-eight Vacancies in the Dental Corps, U. S. Army.

(1) The Acting Surgeon-general of the army announces that there are, at the present time, 68 vacancies in the dental corps, U. S. army, and that examinations for the appointment of dental surgeons will be held at various points in the United States, on Monday, November 4, 1918.

(2) Application blanks and full information concerning these examinations can be procured by addressing "Surgeon-general, U. S. Army, Washington, D. C."

(3) The dental corps is a constituent part of the Medical corps, and consists of officers in the grades of colonels, lieut.-cols., majors, captains, and first lieutenants. Appointments are made at the rate of 1 for each 1000 [now approximately 1 for each 500—Ed.] of the total strength of the regular army authorized from time to time. The law requires that first lieutenants of the dental corps shall serve five years in that grade before being promoted, but for the period of the existing emergency this provision has been suspended by act of Congress, and after one year's service as first lieutenant, a dental surgeon is eligible for promotion to the grade of captain, after which promotions are made in order of seniority as vacancies occur in the higher grades.

(4) No applicant may under existing law be commissioned in the dental corps unless he is between twenty-one and thirty-two years of age, a citizen of the United States, a graduate of a standard dental college, and of good moral character, nor unless he shall pass the usual physical examination required for appointment in the medical corps, and a professional examination which shall include tests of skill in practical dentistry and of proficiency in the usual subjects of a standard dental college course. Whether or not the applicant is married has no effect upon his eligibility for the dental corps.

(5) Application for appointment must be made in writing to the Surgeon-general of the army, upon the prescribed blank form. All the interrogatories on the blank must be fully answered. In compliance with the instructions thereon, the application must be accompanied by testimonials, based upon personal acquaintance, from at least two reputable persons, as to the applicant's citizenship, character, and habits. The selection of the candidates is made by the Surgeon-general from the applications submitted, and a formal invitation to report for examination to the most convenient examining board in each case will be issued by him.

(6) The examinations are conducted under instructions from the Surgeon-general, and usually last six days. No allowances can be made for the expenses of applicants undergoing examination, whether incurred in travel to and from or during their stay at the place of examination, as public funds are not available for the payment of such expenses. Each applicant, upon presenting himself to the board, will, prior to his physical examination, be required to submit his diploma as a graduate of a standard dental college. Should he fail to do so the examination will not proceed.

(7) A first lieutenant receives $2000 per annum; a captain $2400 per annum; a major $3000 per annum. These salaries are increased by 10 per cent. for each period of five years until the maximum of 40 per cent. is reached, excepting that the maximum salary of a major is $4000 a year, and that of a lieutenant-colonel and colonel is $375 and $416.66 per month, respectively. In addition to their pay proper, they are furnished with a liberal allowance of quarters according to rank, either in kind, or where no suitable Government building is available, by commutation. Fuel and light therefor are also provided. When traveling on duty an officer receives mileage for the distance traveled. On change of station he is entitled to transportation of professional books and papers and a reasonable amount of baggage at Government expense. Groceries and other articles for their own use may be purchased from the quartermaster at about wholesale cost prices. Dental surgeons are entitled to medical attendance and hospital treatment without charge other than for subsistence.

(8) Officers of the dental corps are entitled to the privilege of retirement after forty years' service, or at any time for disability incurred in the line of duty. On attaining

the age of sixty-four, they are placed on the retired list by operation of law. Retired officers receive three-fourths of the pay of their rank (salary and increase) at the time of retirement.

(9) In order to perfect all necessary arrangements for the examination, applications must be in the possession of the Surgeon-general at least two weeks before the date of examination. Early attention is therefore enjoined upon the intending applicants.

Promotions.

Army Dental Corps.

THE following appointments (promotions) are announced (August 31st):

To be MAJORS: Capts. Merton M. Postle, James L. Clements, and John P. Garriott.

To be CAPTAINS: 1st Lieuts. Benjamin Naidis, Reginald L. Felton, and Edgar T. Haynes.

Announced September 7th:

To be CAPTAINS: 1st Lieuts. Wall M. Billings, Wm. I. Setzekorn, John F. Ailworth, Gerald F. Stoodly, Bernard Ragland, Walter F. P. Zell, Edwin V. Morris, Herman J. Keyser, Daniel Jutton, and Thomas W. Conly.

Announced September 14th:

To be CAPTAINS: 1st Lieuts. Jackson H. Smith and Blake A. Sears.

Teaching Oral Hygiene to French Children.

AMERICAN RED CROSS.

American Red Cross worker showing French children the importance of taking care of their teeth and how to keep them clean. Over 173,000 people attended this "child welfare" exhibition. The motto CLEAN TEETH DO NOT DECAY is as applicable in our own "second line of defense" as just behind the front.

Preparedness League of American Dentists.

ORGANIZED UNDER THE AUSPICES OF THE N. D. A.

THE DENTAL COMMITTEE OF THE GENERAL MEDICAL BOARD, WHICH IS THE AGENCY FOR THE MEDICAL AND DENTAL PREPAREDNESS IN THIS WAR EMERGENCY, HAS MADE IT POSSIBLE FOR EVERY DENTIST IN THE UNITED STATES TO ASSIST IN THE WORK, UNDER THE SUPERVISION OF THE PREPAREDNESS LEAGUE OF AMERICAN DENTISTS. HEADQUARTERS AT 50 EAST 42D ST., NEW YORK, N. Y.

FROM THE PRESIDENT.

WE are starting on our third year with the following officers elected at our annual meeting in Chicago on Aug. 9, 1918:

President—J. W. Beach, Buffalo, N. Y.
Vice-president—J. D. Millikin, San Francisco, Cal.
Secretary—O. A. Oliver, Nashville, Tenn.
Treasurer—L. M. Waugh, New York, N. Y.
Representing the Surgeon-general's Office—Lieutenant J. V. Gentilly, New York, N. Y.
Director-general—W. D. Tracy, New York, N. Y.

We deeply regret the resignation of Dr. C. F. Ash as Director-general, but activities in other directions made it imperative. He has been appointed a member of a committee for the conservation of platinum, an office which will occupy a large share of his time. His services as Director-general have been of inestimable value to his country and to the League, and a more efficient incumbent could not have been found. I know every member joins me in these sentiments, together with good wishes and the hope of long service to his Government.

The assurance given by Dr. Ash that his interests are with the League at all times, also that his services will be given just as freely as before, somewhat mitigates our regret at his resignation; nevertheless, his active management will be greatly missed.

THE NEW DIRECTOR-GENERAL.

Dr. Tracy, our new Director-general, has been director for the department of the Northeast as well as chairman of the New York unit of the League. He is, therefore, especially qualified to assume the broader duties, he having been, as it were, the understudy of Dr. Ash. No better selection could have been made, and it gives me great pleasure and satisfaction to indorse him in every particular. This step means for him great sacrifice, but he has offered himself willingly and gladly to this service. Every worker of the League will receive the fullest co-operation from his department, and I know that he will receive an equal return from our members and that the benefits of our work will continue to increase.

COLONEL LOGAN AND THE LEAGUE.

In his President's address before a great audience of more than 5000 people in the Auditorium Theatre, Chicago, on the evening of August 6 last, Colonel Logan, as President of the National Dental Association, spoke in most appreciative terms of the service the League has rendered in making the registrant dentally fit for military duties. We are deeply grateful for such expression, yet feel that our members are justly entitled to it. No one will ever know the amount of free service given by the dentists of America, not more than one-third of which will ever be recorded.

A suggestion was made by Colonel Logan that, inasmuch as the military camps are now well equipped, the army dental department is in a position to do the necessary fillings for the recruit after entering the service; therefore, it is his desire that the League give special attention to reclaiming the dentally unfit in order to place them in class A. By so doing, the dentist may render the greatest service to the Government by augmenting our fighting forces.

Continue doing all necessary fillings and extractions as heretofore, for *there is more dental work needed* by our soldiers than could be done if *every one* of the 50,000 dentists of the United States should devote his whole time to this purpose. Shoulder the additional burden manfully and cheerfully for the sake of our own boys who are laying down their lives by the thousands that we may spend our declining years in our own peaceful coun-

try and under the protection of the flag that shall bring enduring democracy to the whole world.

Assure Colonel Logan of our co-operation in this way.

THE WHEELS OF THE LEAGUE.

The Dental Motor Car Exhibit in Grant Park, opposite the Auditorium Hotel, during the meeting of the N. D. A. at Chicago, proved one of the most interesting features of the convention. Chairman Weaver secured a host of friends for the car, and its future usefulness is assured. The Red Cross soon will begin shipping them overseas for active service at the front.

It remained, however, for Dr. Ottolengui to again demonstrate his resourcefulness and originality of thought by inaugurating a plan for securing a Dodge motor car for the special use of the dental officers in each military camp. This movement is much needed, as a motor car will greatly increase the usefulness of the officers by transporting them rapidly on their daily round of duties.

Through his activity, ably assisted by Dr. F. M. Casto, more than $1100 was raised in less than one hour at the meeting of the American Society of Orthodontists, and he immediately ordered a car delivered at Camp Greenleaf. Another one has been ordered for Camp Upton, and more will follow as rapidly as possible. These cars will be presented through the League, and will pass from commandant to commandant as changes occur in the camps.

OUR STUDY COURSE.

One of the most urgent duties of the League is to make available a course in war oral and dental surgery for the civilian practitioner. We are exerting every effort to have it ready as soon as possible. Some delay has been caused by unavoidable circumstances, but League members may be sure no further delay will occur.

J. W. Beach, *President.*

FROM DIRECTOR-GENERAL TRACY.

While it is true that as the dental corps of the United States Army increases in numbers and efficiency the need for volunteer services on the part of the Preparedness League in connection with filling operations will correspondingly be reduced, it is not intended that the activities of the League shall be curtailed in this respect at present, as the accession of men from the new draft will be greater, both as to numbers and rapidity of induction than heretofore. It is, on the contrary, absolutely necessary that greater impetus and effort be given to our work.

BRIDGE WORK.

It is also desirable that the scope of our work should be broadened to include the restoration of those registrants who are physically fit for general military service, and are held in group C solely because of their dental deficiency. A large percentage of these cases can be restored by the insertion of small bridges, thus bringing them up to the minimum dental requirements of six masticating teeth in occlusion and six incisive teeth in occlusion. No extensive restorations by bridge work are contemplated. In other words, only those cases are recommended for treatment which can be brought up to minimum requirements by the insertion of a small and inexpensive bridge.

At present there is no Government regulation compelling registrants in the class mentioned to have this work done at their own expense, and no provision exists making it possible for them to have this work done at the cantonments.

Most of the men mentioned above are anxious to be made dentally fit in order that they may be inducted into general military service and thus be of use to their country in the fighting line. I have found that with few exceptions the local boards throughout the country are very appreciative of the dental services rendered to the registrants under their control by the members of the Preparedness League, and I am sure if it is known that we have a large list of volunteer dentists who have offered to take cases of the type outlined above, a great number of registrants now standing in group C can be restored and immediately transferred into class 1-A.

It is, therefore, plainly the duty of every member to write to the League officer in charge of the work in his section notifying him that he will be glad to take one, two, or more cases each month, without expense to the registrant, the League, or the Government.

FAMILIES OF SOLDIERS.

Our activities should also embrace the care of dependent families of our soldiers, sailors, and marines, who are unable to pay for dental services. It has also been stated that one of the greatest possibilities for service on the part of the Preparedness League and its members would be a full and free co-operation between the League and the Home Service Section of the Red Cross.

In many instances the wives and families of soldiers in the U. S. army who have been accustomed to private dental treatment, but who, because of the reduction in their incomes cannot now afford to go to a private practitioner, should be taken care of by the volunteer dentists of the Preparedness League.

The Home Service Section of the Red Cross, through their authorized agents, will investigate each case as presented, and in those cases recommended for dental treatment at the hands of the Preparedness League the patient will receive a card bearing the indorsement of the Red Cross, stating that the patient is a member of a soldier's family and worthy of free dental treatment. In this manner much suffering can be alleviated and much dental trouble prevented among the families of the men who have gone forward to defend our country.

The medical profession is already co-operating most generously with the Home Service Section of the Red Cross, and it is hoped that every member of the P. L. A. D. will share in this work.

This type of work has already been begun by a number of Preparedness League units in various states, and the pleasure and satisfaction which the members are finding in taking care of these cases warrant us in believing that it can be extended to every state in the Union. Plans are now being formulated to take care of this new department in our activities and it is the intention of the officers of the League to have the work so arranged as to bring no special hardship on any one member.

While the Allied forces are meeting with gratifying success at the front and ultimate victory is assured, this is no time for relaxation in any of our war activities or patriotic efforts, and it is only by putting every ounce of human energy into action that the result desired by all truly civilized peoples can be attained.

As a national patriotic body of professional men we are strong and well organized, but in a few states the work has developed slowly, and it is urged that in such states the directors and officers grasp anew the great possibilities of the League's work and take up with increased determination the duties they have assumed.

Assuring you of my desire to assist and co-operate with you in every possible manner, I am,

Yours very truly,

W. D. Tracy,

Director-general for the U. S.

FROM THE COMMITTEE ON MOTOR CARS FOR CAMPS.

The undersigned this summer visited Camp Greenleaf, which adjoins Fort Oglethorpe, Ga., and is some six or eight miles from Chattanooga, Tenn. Here are situated training schools for medical men, dentists, and others. It is with the dental training school, of course, that we are most interested. The dental corps at each military camp is badly in need of means of rapid transportation about the camp and to the neighboring city. Camps accommodate from 25,000 to 75,000 men; cities of that size would have trolley cars, cabs, and other means of transportation; moreover, there would be numerous shops. At a military camp there is but one place for procuring any needed article, and all such places are widely scattered. It is manifest that an automobile would greatly add to the efficiency of the dental corps at each camp, by saving time that would otherwise be expended in walking great distances. This is so true that many officers have purchased second-hand Ford or Dodge cars, but these being private property must be maintained at the officer's individual expense. Bills for gasolene, tires, repairs, etc., make large holes in an officer's pay check. This seems hardly fair.

The writer, therefore, conceived the idea that the Preparedness League should procure a car for Camp Greenleaf. On his return to New York he reported this to Director-general Ash, and was surprised to learn that a visit to Camp Upton had impressed Dr. Ash with the same need, and he was just inaugurating a campaign for obtaining funds for that purpose. The writer was then appointed chairman of a committee to foster this movement. Drs. Ash and Tracy sent out a circular appeal to the dental profession in New York, and through their generous response a Dodge car has been presented to the dental officers at Camp Upton.

The writer sent out a circular letter to one hundred men throughout the country asking for contributions to a fund to purchase a car for Camp Greenleaf. Before replies could have been expected to come in, the meeting of the American Society of Orthodontists convened in Chicago, and Dr. F. M. Casto, secretary of that society and an officer in the League, suggested that an appeal be made in open meeting for contributions. This was done, with a response that redounds to the credit, loyalty, and generosity of the members of that organization, not overlooking a few guests who were present: $1131 was sub-

scribed, and paid in, in just thirty-eight minutes. A Dodge touring car was purchased by telegraph from a firm in Chattanooga, was promptly delivered, and is in use at the camp. A quotation from a letter of thanks received from one of the dental officers places this work in an aspect which is important, as follows:

"When the high officers of the camp see our car, and when the instructors in the Sanitary, Cardio-vascular, T. B., X-ray, Orthopedic, and other schools see it they know that the members of our profession are backing us for all they are worth and that we mean business. All such things serve to send dentistry higher and higher in the estimation of the men around us, and through these things to stimulate us, we hope, to drive so hard that some day when the old standards of dentistry emerge from the war clouds, their colors will be flying high, and Uncle Sam and the whole world will turn to our profession and say, 'Well done, good and faithful servants.'"

The League may not be able to supply cars for all the military camps, but we are undertaking to furnish cars for at least ten more. We are at this moment awaiting the decision of the authorities as to which camps are most in need. As soon as these camps are selected, the state directors will be advised and asked to co-operate in collecting funds towards the car for the nearest camp.

After paying for the two cars already purchased and delivered, we are pleased to report that we already have a goodly sum left in the treasury of this fund.

R. Ottolengui, *Chairman,*
Com. Motor Cars for Camps.

SPECIAL NOTICE.

Stenographers and Typists Wanted—Men and Women.

You are urged, as a patriotic duty, to enter the Government service in Washington, D. C., for important war work as stenographers and typewriters.

Women, especially, may thus aid in the nation's great effort. Men also are needed. Those who have not the required training are encouraged to undergo instruction at once.

Tests are given in 550 cities every Tuesday.

The Government maintains a list of available rooms in private houses in Washington and is erecting residence halls to accommodate thousands. Full information and application blanks may be obtained from the Secretary of the Local Board of Civil Service Examiners at the postoffice or custom-house in any important city.

JOHN A. McILHENNY,
President, U. S. Civil Service Commission,
Washington, D. C.

Portions of an additional circular to Editors give the following additional particulars:

"In the matter of housing in Washington, it may be said that the Room Registration office of the District Council of Defense, at 1321 New York ave., has on its list more than 4000 rooms which have been carefully inspected and are available for new appointees. The usual charge for rooming accommodations with board, that is, the two principal meals of the day, is $40.00 a month, but in order to obtain this rate two persons must ordinarily occupy one room. In addition, the Government will soon erect residence halls, including cafeterias, for the accommodation of Government employees in Washington. . . .

"It is perhaps unnecessary to say that an efficient civil service is as important as the armed forces in the prosecution of the war."

John A. McIlhenny, *President.*

SOCIETY NOTES AND ANNOUNCEMENTS

NOTICES should reach the Office of the DENTAL COSMOS not later than the 11th or 12th of the month preceding that of publication.

The National Association of Industrial Dental Surgeons.

THE National Association of Industrial Dental Surgeons was organized at Chicago during the time of the recent meeting of the National Dental Association, with the following officers elected for the ensuing year:

President—DR. CARL E. SMITH, The B. F. Goodrich Co., Akron, Ohio.
First Vice-president—DR. W. A. BRIERLY, Colorado Fuel & Iron Co., Pueblo, Colo.
Second Vice-president—DR. G. L. EPLING, Pocahontas Fuel & Iron Co., Maybeury, W. Va.
Treasurer—DR. R. I. HUMPHREY, International Harvester Co., Chicago, Ill.
Secretary—DR. E. L. PETTIBONE, 6503 Detroit ave., Cleveland, Ohio.
Chairman Board of Directors—DR. THADDEUS P. HYATT, Metropolitan Life Ins. Co., New York, N. Y.

E. L. PETTIBONE, *Secretary.*

Northeastern Dental Association.

THE twenty-fourth annual meeting of the Northeastern Dental Association will be held at the Narragansett Hotel, Providence, R. I., on October 10, 11, and 12, 1918.

ALVIN A. HUNT, *Sec'y,*
Hartford, Conn.

Susquehanna Dental Association of Pennsylvania.

THE fifty-fifth annual meeting of the Susquehanna Dental Association of Pennsylvania will be held at Hotel Casey, Scranton, Pa., October 9, 10, and 11, 1918.

GEO. C. KNOX, *Rec. Sec'y,*
300-301 Dime Bk. Bldg., Scranton, Pa.

Northern Illinois Dental Society.

THE Northern Illinois Dental Society will meet at Joliet, Ill., October 9th and 10th, 1918. A fine program and clinic is assured. Mark off the time now, and plan to attend.

E. L. GRIFFITH, *Sec'y,*
Freeport, Ill.

Forsyth Dental Infirmary for Children.

NEW DEPARTMENT—LIBRARY AND MUSEUM.

THE trustees and director of the Forsyth Dental Infirmary for Children have authorized the creation of a new department, to be

known as the "Library and Museum." They solicit from the dental profession contributions of books and dental periodicals, particularly those out of print and not readily obtainable by purchase; also specimens of dental abnormalities, casts, or specimens of unusual structures of dental interest, for all of which permanent acknowledgment will be given.

FREDERICK A. KEYES, D.M.D.,
Librarian and Curator of Museum.

National Mouth Hygiene Association.

DEPARTMENT OF EXTENSION LECTURES.

A COMPLETE lecture set, consisting of full manuscript and thirty-six specially selected and prepared lantern slides covering the subject of Mouth Hygiene, is furnished by this association to members of state dental societies and others who may be considered as qualified to present the subject on the lecture platform.

For rental and sale terms and other particulars address the undersigned.

EDWIN N. KENT,
Director of Extension Lectures,
330 Dartmouth st., Boston, Mass.

Missouri Dental Examiners.

THE next meeting of the Missouri Dental Board for examining applicants to practice dentistry in Missouri will be held in Jefferson City, beginning at 8 A.M. on Monday, October 14, 1918.

For further information, write

V. R. MCCUE, *Sec'y,*
Cameron, Mo.

Massachusetts Board of Examiners.

A MEETING of the Massachusetts Board of Dental Examiners will be held in Boston, Mass., October 21 to 25, inclusive, 1918, for the examination of candidates for registration. All applications must be in the hands of the secretary on or before October 11th. For further information address

GEORGE H. PAYNE, *Sec'y,*
29 Commonwealth ave., Boston, Mass.

Michigan Board of Examiners.

THE next meeting of the Michigan State Board of Dental Examiners will be held at the Dental College, University of Michigan, Ann Arbor, Mich., November 18 to 23, 1918, inclusive. Applications and other information may be obtained by addressing

B. S. SUTHERLAND, *Sec'y,*
Owosso, Mich.

Oklahoma Board of Examiners.

THE Oklahoma Board of Dental Examiners will hold their next regular semi-annual meeting at the State Capitol building, Oklahoma City, Okla., beginning December 9, 1918. Reciprocity only with Kansas, Missouri, Arkansas, Nebraska, Indiana, and District of Columbia.

For further information address

H. OVERBEY, *Sec'y,*
Ryan, Okla.

Montana Board of Examiners.

OWING to the present war conditions and the lack of a sufficient number of applicants, the Montana Board of Dental Examiners will *not* hold the usual January examinations. The next examinations will be held at Helena, Mont., on July 14, 15, 16, and 17, 1919.

T. M. HAMPTON, *Sec'y,*
Helena, Mont.

Illinois Dental Examiners.

THE next meeting of the Committee of Dental Examiners for the examination of applicants for licenses to practice dentistry in Illinois will be held in Chicago, the week commencing Monday, October 28th.

For application and further information, address the Department of Registration and Education, Springfield, Ill.

NOTICE.

The Department of Registration and Education of the State of Illinois has succeeded to the rights, powers, and duties vested by law in the late State Board of Dental Examiners.

The purely professional features of the dental law are in the hands of a committee, appointed from time to time by the director

of the department for this particular purpose. All of the administrative features of the law are handled by the Department of Registration and Education.

All correspondence in regard to applications, examinations, etc., in Illinois should be addressed to the Department of Registration and Education, Springfield, Ill.

F. C. Dodds,
Sup't of Registration.

United States Patents

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING JUNE 1918.

June 4.

No. 1,268,171, to Roy L. Spaulding. Attachment for dental engines.

No. 1,268,544, to Lorwin N. Cates. Toothbrush.

June 11.

No. 1,268,886, to Adolph W. Schramm. Chair.

No. 1,268,944, to Frederic Ecaubert. Dental-floss device.

No. 1,268,968, to Frank Z. Hanscom. Tooth.

No. 1,269,440, to Edward R. Hoff. Artificial tooth.

No. 1,269,521, to Walter H. Bowman. Artificial tooth.

No. 121,929, to R. H. Nelson. Trade-mark for dentifrice.

No. 121,941, to Parfumerie Marceau, Inc. Trade-mark for dentifrices.

June 18.

No. 1,270,233, to Max Stoorman. Rotary toothbrush.

No. 14,487, to Henry Ward Babcock. Reissue—Dental process.

June 25.

No. 1,270,512, to Charles Noel Greaza. Tooth-powder can and brush holder.

No. 1,270,565, to Charles K. Teter. Pharyngeal inhaler.

ISSUED DURING JULY 1918.

July 2.

No. 1,270,942, to George W. Grimm. Artificial tooth.

No. 1,270,943, to George W. Grimm. Artificial tooth.

No. 1,271,161, to Rupert E. Hall. Dental articulator.

No. 1,271,252, to Joseph T. Wilson. Toothbrush.

July 9.

No. 1,271,531, to Elliott Allingham. Slip connection for dental bridge work.

No. 1,271,850, to John E. Canning. Tooth regulator.

July 16.

No. 1,272,579, to George W. Todd. Dispensing receptacle.

No. 1,272,912, to John E. Burns. Dental casting machine.

No. 1,272,985, to Ichigoro Nakahara. Dental articulator.

July 30.

No. 1,274,116, to August Weber. Tooth-comfort kit.

No. 1,274,133, to Herman Ausubel. Toothbrush holder.

No. 1,274,322, to Jacob Petry. Pattern for dental plates.

No. 122,380, to Rollo H. Ferry. Trade-mark for pharmaceutical preparation for use in dental work.

No. 122,386, to Mentho Listine Chemical Co. Trade-mark for mouthwash and tooth paste.

No. 122,402, to George Winckler. Trade-mark for tooth, nail, hair, mustache, artists', clothes, and bathing brushes.

THE

DENTAL COSMOS

VOL. LX. NOVEMBER 1918. No. 11

ORIGINAL COMMUNICATIONS

The Control of Focal Infections.

By C. H. MAYO, M.D., Rochester, Minnesota.

(Presented before the fiftieth anniversary meeting of the Dental Society of the State of New York, Saratoga Springs, N. Y., June 13–15, 1918.)

ALL life, from the standpoint of health and disease, is cell life. The chemistry of the world's activities is developed through the functional activity and protoplasm of the cell. The first forms of life, unicellular organisms, are lawless in their activities, multiplying without limit as food and environment is secured, and the stronger destroying the weaker. The normal type of microbe lives on the weaker animal and on the plant type of life, completing its existence from lack of food or the resistance of the host. It then dries into spore form, to again spring into action under suitable conditions. The lawless existence in unicellular organisms in contrast to multicellular life does not occur naturally. When the multicellular organisms appeared, true death entered the world. Under necessary control of growth and function through community existence, they became the prey of the unicellular organism. Man should not complain of the action of these organisms, because through them occurs the evolution of the world, and the bad effects of certain germs under abnormal conditions may be far outweighed by the good they do.

If one considers the countless numbers of unicellular organisms, many so small as to require the highest power of the microscope to be seen, and many of whose existence we know and yet have failed to identify, it will be seen that, of these, few in proportion to the total number are destroying agents. The greater part of the disease germs are under the control of man's intelligence, if he has the power to enforce the preventive measures known to the world today. It is through such measures, applied in earlier life, that during the last thirty years the life of man has been lengthened a number of years. The microbes causing disease in man eventually bring about a stage of his life in which sudden death occurs from affections of the heart, brain, and kidneys, between the ages of fifty-two

and sixty-two years, as we have in no way changed middle age or advanced many more into old age. Death which is not accidental is due to the effects of the action of microbes—a result that may be acute and sudden, or chronic and slow in its termination.

The contagious character of various diseases has been appreciated for untold ages, and it has been known that certain of them developed some change in the individual which rendered him immune to a second attack of the disease. The first disease for which a vaccine was developed was that of smallpox, and while used in China and India long ago, it was first used in Europe in Belgrade, and was brought to the English-speaking people by the discoveries of Jenner.

A study of the blood in disease, as varying from its condition in health, and the action of its cells in developing antibodies, has been of wonderful value to mankind. Through this study, acute diseases that create an immunity are reduced in morbidity and mortality by increasing the resistance of the patient, as in tetany, typhoid, paratyphoid, typhus, yellow fever, etc. The innumerable diseases that formerly decimated mankind have been almost driven from the earth.

It is because of this wider knowledge of medicine that it has been possible to continue the present war without the enormous armies being destroyed by diseases which would long since have brought the war to an unsatisfactory termination.

We find, then, that there is developed in the blood stream, in acute diseases and fevers, an immunizing agent. On the other hand, with certain diseases there is, at some place in the body, a small focus of bacteria continually maintained, developing not an immunity but an anaphylactic reaction of the constant supply of microbes or microbe toxin instead of elevating the resistance of the patient against the germ. Such persons are subject to recurring colds on the slightest provocation, recurring neuralgias, recurring myositis, muscular rheumatism so called, lumbago, sore muscles of the back and neck, etc., and it has been enough in the past for the patient to say he is subject to such trouble and for the doctor to make local applications and allow time to complete the cycle of improvement until, from any cause, lowered body resistance again reinstates the liability to an attack—and any part once affected by a microbe becomes more liable to repeated attacks.

We have also protein poisoning. Many persons are unable to eat various grains or berries, milk, fish, etc., which cause them to develop asthma or chronic diseases of the respiratory tract, or of the mucous membrane or skin, shown by local swelling, diarrheas, or eczema.

Although there are but few places in the body in which man quite regularly carries bacteria, they are always in the mouth, often in the tonsil and about the teeth in pyorrheas, alveolar abscesses, and buried crypts of tonsils. All tonsils that are capable of reacting to the infection and are of good size, 3 or 4 on the scale of 4, are usually not the cause of chronic disease but of strictly local involvement, and when inflamed temporarily, develop systemic disturbances. The position is most difficult for many physicians who have but recently come to a knowledge of the danger of a focus in these instances, not realizing that the blood stream is the carrier of the infection. In such cases the localizing trouble in the sciatic nerve or in the joint did not begin there, but arose from the existence of bacteria in a minute pocket, and if that pocket is under tension the disease is essentially chronic. The physician examines the throat and says the tonsils are not inflamed, or are graded 1 or 2 in size, and cannot be the source of the trouble. The dangerous tonsil is the one graded 1 or 2, without any effects of local inflammation on its surface.

Diseased teeth are often local foci of infection, and the X-ray has been of inestimable value in determining the presence of alveolar abscesses, absorbed roots of teeth, or absorbed bone about the roots. The findings are striking, when positive, but many pockets do not show

in an apparently good picture. The dangerous tooth is a crowned tooth, and if it is necessary, from the seriousness of chronic, recurring diseases which affect the heart, as a myocarditis, or the kidneys, or the joints or nerves, then small tonsils must be removed and teeth most carefully inspected, X-rayed, and, when diseased, extracted on the basis of symptoms, should they be of major importance. Endarteritis, overgrowth of bone about the joints, including the hip and spinal vertebræ, are also due to minor types of bacteria, which are probably in pockets not under tension. I have far less fear where nature loosely holds the bacteria; the dangerous ones are always under tension and in small areas, although we must now come to the acceptance of the fact that the blood of apparently healthy persons often contains microbes.

In our bodies, with almost no evidence of it, are living and growing the amœba, the syphilitic spirochete in almost every place, the hookworm, and other germs too numerous to mention, and often temporarily doing no more harm than trout in spring water. We have wandering leucocytes with almost the power of animals to leave the blood stream, forage for material dangerous to life, and return to the circulation; and in many of us a little blood drawn and time given for culture will show some kind of microbe to be present. The stomach does not destroy all the bacteria taken into it; some may pass into the blood by the chyle duct, and probably more commonly enter the blood stream by way of the portal circulation but are destroyed in the liver. The germs in the mouth are carried on into the stomach, and in the great majority of persons there are numerous bacteria living in the gastric juice after all food has left the stomach. The dangerous varieties are those of the acid type, while those of alkaline nature are nuisances.

Of secondary importance to the microbe, from a biologic standpoint, is the chemistry of the fluids of local areas for their environment. This is similar to the result from seeds planted or blown upon different soils. They may be planted to no purpose on the wrong soil, and they may be blown everywhere to take growth to advantage in proper environment. Bacteria carried throughout the body by the circulation are able to take up local growth only when thus carried to a given area. This accounts for the specificity of bacteria in their location causing acute and self-limited diseases, or chronic recurring or relapsing diseases. The acidity, the oxygen tension, and the condition of the general health, or local injury, may all be factors. Some forms will only grow in a certain place, as poliomyelitis in the brain and spinal cord, others in the sheaths of nerves, the first causing acute conditions, self-limited, and the latter, recurring neuritis. Thus we have rheumatism, appendicitis, gall-bladder inflammations and ulcers of the stomach, valvular diseases of the heart; in fact, nearly all of the local and general diseases of which we have knowledge are thus produced.

The factors of safety are largely within the control of man, in preventing diseases, and in the transference of immunizing resistant bodies, such as have been developed for the cure and prevention of diphtheria, typhoid fever, smallpox, poliomyelitis, and many other affections.

Diseases of middle life are increasing. They are microbic, of a chronic, recurring character and are carried into the blood stream from a few foci, the mouth being the source of greatest danger. A crowned tooth is not a crown of glory, and may cover a multitude of germs. Modern dentistry is relieving the world of much of its misery by watchful care of foci connected with the teeth, and the trend of modern medicine and dentistry is bringing their fields again closely together. Dentistry should be a department of medicine, as it is as closely associated with medicine as are the specialties of the eye, ear, nose and throat, etc.

[See also *Discussion,* as reported under "Proceedings of Societies," this issue.]

Procain for Dental Operations.

By STEPHEN P. MALLETT, D.M.D., Boston, Mass.
(U. S. Navy.)

(Read before the Virginia State Dental Association, Roanoke, Va., April 29 to June 1, 1918.)

IN these days, when our country calls upon each and every citizen to do his bit in the suppression of Prussianism, it is the duty of every dental practitioner to be fully prepared to render expert service.

The mills of progress must go on, even though a great many of our people are in some field of service. Those who are to carry on the work of maintenance, construction, and preparedness must not be burdened with unnecessary pain or trouble. The efficiency of a person, group of persons, or community can be seriously impaired by the ravages of disease or needless suffering, and it is within the province and duty of the dental profession to eliminate as much unnecessary pain as is consistent with present-day teachings. We can at least approach the ultimate ideal of a safe, painless oral operation, and it is an undeniable fact that in all time there has never been a better or safer anesthetic than the procain-suprarenin combination. Therefore we should all familiarize ourselves with this drug and its uses.

The new name, "Procaine," is under license of the Federal Trade Commission, in place of the old name, "Novocain."

As far back as 1853, experiments were conducted along the lines of local anesthetics, but for the most part they were unsatisfactory until Koller demonstrated the anesthetic properties of cocain, in 1884. In 1885, conduction anesthesia was first employed by Halsted, who injected the anesthetic in the vicinity of the inferior dental nerve rather than in the immediate vicinity of the tooth. Braun, to whom the title of "father of modern local anesthesia" is applied, made the suggestion of the addition of the suprarenal capsule to the injecting solution.

I need no more than mention the danger of the use of cocain, because of its toxic effect. Procain fulfils the requirements of a safe and effective anesthetic, inasmuch as under satisfactory conditions it will permit the most delicate operations to be performed in peace and quiet, with very little hemorrhage, without haste or interruption, and with very little after-pain.

ANESTHETIC PROPERTIES OF PROCAIN.

Procain, which is seven times less toxic than cocain, occurs in small, colorless, and tasteless crystals, is soluble in water and less so in alcohol. It can be heated to 120° C. without decomposing. It produces the general alkaloid reactions and has the same effect on the peripheral sensory nerves as cocain. Procain creates no irritating effect upon the most sensitive tissues even when applied in strongly concentrated solutions, and no systemic effects are perceptible. It does not even affect the respiration, circulation, or cardiac function.

The 2 per cent. solution is the best for both infiltration and conduction anesthesia. With few exceptions, even in cases of anemia, neurasthenia, nephritis, arterio-sclerosis, heart diseases, or cases of general weakness, it is not found necessary to weaken the solution. The maximal dose is 0.5 gm. for subcutaneous

injections, but as much as 2 gm. has been used subcutaneously with no bad results. The maximal dose of 24 mils, or 12 syringefuls, of a 2 per cent. solution is more than is ever called for in dentistry. The U. S. P. IX has discarded the term "cubic centimeter" (abbr. Cc.) on the ground that the United States Bureau of Standards declared the term a misnomer, there being a slight difference between the thousandth part of a liter and a cubic centimeter. The word "mil," the first three letters of the whole word millimeter, has been adopted, and therefore in speaking of dosage I shall use the word mil in place of cc.

SUPRARENIN.

Suprarenin has great anemia-producing power and is a strong astringent. It is used with procain to contract the capillaries and tissues locally, in order to prevent absorption and infiltration into the soft tissues, thereby strengthening the anesthesia, and also to decrease bleeding in certain operations. It is more stable, keeps better, and is less toxic than any of the other anemia-producing substances. It is easily decomposed by free alkali, air, and heat. It is the strongest hemostatic and astringent known. For general use a solution containing 0.000,015 – 0.000,02 gm. of synthetic suprarenin to 1 mil (or a 0.0015 – 0.002 per cent. solution) is the best.

Therefore the combination of procain-suprarenin possesses the five essential qualities that a local anesthetic should possess to be satisfactory:

(1) The substitute should not be inferior to cocain in its anesthesia-producing power.

(2) It should be relatively non-toxic.

(3) It should have no irritating action even on the most delicate tissues.

(4) It must be easy to combine with suprarenin, and when so combined it should not lose its anesthesia-producing power; neither should it affect the action of the suprarenin, and it should be soluble in water.

(5) It must be unaffected by boiling.

The procain-suprarenin tablets are most suitable for our work. They are put up twenty in a tube, and they are sterile and reliable. There are three tablets on the market most suited for dental operations, viz, E, F, and T tablets.

Procain-suprarenin tablets E contain

	gram.
Procain	0.02
Suprarenin	0.000,05

Procain-suprarenin tablets F contain

	gram.
Procain	0.05

The combined E and F tablets with 3½ mils of Ringer's solution yield a 2 per cent. solution. The T tablets also yield a 2 per cent. solution, and have the same amount of procain and suprarenin as the combined E and F tablets.

The Ringer solution contains

	gram.
Sodium chlorid	0.50
Calcium "	0.04
Potassium "	0.02
Distilled water	100.00

Ten Ringer tablets to 100 mils of water, boiled for fifteen minutes, give the Ringer solution.

The apparatus consists of two Fischer syringes, one mounted in a short hub with a 26-mm. and the other in a long hub with a 42-mm. iridio-platinum needle. It is better to use iridio-platinum needles, because it simplifies matters in that they do not need to be boiled before using, can be used again, and are always mounted and ready. Iridio-platinum needles should be sterilized in the flame. They are easily sharpened by the use of a sandpaper disk. Steel needles are not so applicable because they break rather easily, oxidize, rust, and must be boiled just before using, which requires considerable time. However, because of the liability of needles to break off while injecting, I think it better to use steel needles for conduction anesthesia, because when broken off they are more easily removed surgically. A powerful magnet may be

used for removing them. The syringes should be held on a specially made stand in an all-glass jar containing alcohol. I have found that if extreme methods of cleanliness be employed, and any apparatus used be thoroughly cleansed and sterilized after using, a 99 per cent. solution of alcohol simplifies sterilization and is efficient. Two dissolving-cups, one graduated to 3 and the other to 10 mils, should be kept in absolute alcohol. The cups are made of porcelain and can be easily cleaned with dilute hydrochloric acid.

There should be one double-corked bottle for Ringer's solution.

Another jar should contain sterile distilled water in which to rinse the syringe and boiling-cup in order to rid them of alcohol. A glass tray in which to keep tablets, wires, wrench, reserve needles, syringe parts, and engine stones is also desirable.

Care should be taken not to handle the tablets, always replacing the cotton, rubber stopper, and cap immediately, otherwise the drug will deteriorate because of contact with air and moisture. If the solution turns pink it is contaminated and should not be used under any circumstances.

PREPARING THE SOLUTION.

Remove the syringe and cup from the jar and rinse all the alcohol off in distilled water. Fill the cup to the mark desired with Ringer's solution, and heat the solution to boiling. Add the tablets and do not boil, but pass through the flame to dissolve the tablets.

For normal cases: One T tablet to each mil gives a solution with

Procain .....2 per cent.
Suprarenin .....0.000,02 gm. to 1 mil.

For deep anemia: One E tablet to each mil gives a solution with

Procain .....2 per cent.
Suprarenin .....0.000,05 gm. to 1 mil.

For normal cases: Two F tablets and one E tablet to 6 mils gives a solution with

Procain .....2 per cent.
Suprarenin .....0.000,009 gm. to 1 mil.

The needle should be sterilized on the syringe in the flame, and the syringe is filled, carefully avoiding touching the needle.

REQUIREMENTS OF A SOLUTION PREPARED FROM TABLETS.

(1) The solution should be immediately used after it has been prepared.

(2) The solution should not come in contact with anything except the boiling-cup and the syringe. It should not be left longer than is absolutely necessary in the dissolving-cup nor in the syringe. The solution is very sensitive, being affected and chemically changed by heat, air, light, and especially alkalis.

(3) The tablets should be white, and the prepared solution should be the color of water.

PREPARATION OF THE PATIENT.

The operator must inquire as to the health of the patient and have a keen appreciation of the necessity of lessening the amount of suprarenin to be used.

In a few super-sensitive cases when the needle-prick is found to be exceedingly painful and annoying to the patient it is well to administer nitrous oxid and oxygen to the analgesic stage while inserting the needle. A pledget of cotton saturated with a 20 per cent. solution of procain (made from F tablets) and allowed to penetrate slightly into the mucous membrane will also reduce the pain of injection. With a very fine sharp needle in a small syringe one may inject a small quantity before the regular injection is made. Sharp needles lessen the pain of injection.

PREPARATION OF PLACE FOR INSERTION OF NEEDLE.

After placing a small napkin in the mouth about the field of operation, to catch any of the dropping solution, hold the lip away and wipe away all moisture possible. Then with a small pledget of

cotton dipped in a solution of aconite and iodin, equal parts, or campho-phénique, sterilize the part where the needle is more complicated than that of the the area to a small degree.

ANESTHESIA OF THE MAXILLA.

The nerve distribution of the maxilla is more complicated than that of the mandible. In the spheno-maxillary fissure the maxillary nerve divides into the posterior palatal and infraorbital; the first enters the palatine canal and comes out through the larger palatine foramen, supplying the posterior part of the palate and the palatal part of the gum. The infraorbital proper passes along giving off branches through the infraorbital foramen, supplying the outside of the face and the labial part of the gum; the nerve then passes downward along the antrum, forming a plexus supplying the bicuspids, incisors, and cuspid. The anterior superior alveolar branch emerges from the incisive foramen and supplies the anterior part of the palate and the palatal part of the gum.

The alveolar process of the maxilla is very porous, and although the porosity differs over the different teeth, yet it is sufficient to permit the infiltration method, as a rule. But one injection on the labial or buccal side is necessary, as a rule, for single-rooted teeth for operations in the pulp alone.

TECHNIQUE OF INJECTION.

Holding the syringe in the hand as one holds a pen, and with the opening of the needle directed toward the bone, insert the needle half-way between the gum and apex of the root, injecting and pushing the needle along until the periosteum is reached. Then slide the needle upward along the periosteum to reach a point a little higher and distal to the apex of the tooth; then inject slowly and evenly.

All of us have our own methods, but I want to say here that for infiltration anesthesia I have never known of a poor anesthesia or of undesirable results from the so-called "puffing" by injecting. There is space enough between the periosteum and the epithelial layer of the mucous membrane for a considerable quantity of the solution, hence the "puffing."

After depositing 1–1.5 mils of the solution at this point, either remove the needle, or, if the tooth is multi-rooted, slide the needle distally toward the apex of the distal root, thereby using the same insertion for the full injection. Next insert the needle palatally about one-third of the way between the gum margin and the apex of the root, and when certain that the needle point is a little above the region of the apex of the tooth, inject about 0.25 mils of the solution.

It is well to massage the tissues after injecting, as it will quicken the process of absorption. Anesthesia takes place in from five to eight minutes, and lasts from twenty-five minutes to one hour.

ANESTHESIA OF THE MANDIBLE.

The nerve supply of the mandible is simpler than that of the maxilla. The inferior alveolar nerve, which supplies all the teeth, enters the mandible through the mandibular foramen and supplies all the teeth on one side of the jaw, anastomosing in front with the nerve of the opposite side. A branch is given off which emerges through the mental foramen and supplies the anterior part of the gum and the lower lip.

The inferior alveolar nerve, with the artery, lies before, and when entering the mandibular foramen *in,* the pterygomandibular space. This is bounded externally by the sulcus mandibularis, and internally by the internal pterygoid muscle. It is filled with connective tissue which readily absorbs the solution. The nerve lies posterior to the artery.

The lingual part of the gum and the side of the tongue are supplied by the lingual nerve. The lingual nerve first accompanies the inferior dental nerve, then passes farther forward and descends between the ramus and the internal pterygoid muscle at the anterior margin. It then lies half-way between the surface

of the oral mucous membrane and the inferior dental nerve.

The buccal nerve supplies the buccal part of the gum. It is also a branch of the mandibular division of the fifth cranial nerve. The bone in the mandible is much more dense, the outer plate being quite thick and having few pores.

For these anatomical reasons conduction anesthesia is better adapted to the mandible.

CONDUCTION METHOD.

A 2 per cent. solution for conduction anesthesia of the mandibular nerve is quite essential because of the large diameter of the nerve at the point of injection, and therefore the necessity of a strong solution to penetrate to the center.

TECHNIQUE.

Palpate the postmolar triangle with the tip of the index finger of the left hand and with the tip of the thumb of the right hand, with the remaining fingers held outside on the cheek, fixing the jaw. With a long needle (42 mm.) mounted on the syringe, and with the syringe resting on the teeth of the opposite side between the cuspid and first bicuspid, make an insertion into the mucous membrane at 1 cm. over the last molar, feeling for the internal oblique line with the needle just after insertion. Then slide the needle a little more mesially and push it inward, keeping in close contact with the ramus. This may necessitate a different direction of the syringe according to the angle of the ramus to the median line, which varies. After the insertion of the needle, inject a small quantity of the solution. Then slide the needle along the bone until it is inserted about its full extent, depositing from 1.5 to 2 mils in the pterygomandibular space, in which the alveolar nerve and vessels lie. Anesthesia occurs from twelve to thirty minutes and lasts for thirty minutes, and sometimes for an hour and a quarter.

For purely dental operations we need only to anesthetize the nerve which supplies the teeth. If anesthesia of the molars and bicuspids on one side is desired, then the mandibular injection alone is necessary. If all the teeth on one side are to be anesthetized, inject the mandibular nerve on that side and make the mental injection on the other, because of the anastomosis of the two nerves in the median line. For anesthesia of all the lower teeth use two injections, one over each of the mandibular foramina.

For surgical operations it is necessary to anesthetize the lingual nerve, which supplies the mucous membrane lingually, and the buccal nerve, which supplies sensation in the region of the first and second molar and second bicuspid. This can be accomplished in one injection if a sufficient quantity of the solution is used. Generally it is necessary to make a separate injection for the buccal nerve.

MENTAL INJECTION.

Insert the needle into the reflection of the mucous membrane just below the first bicuspid about half-way between the gum margin and the apex of the root. Push the needle downward and slightly backward along the bone for a few millimeters until about half-way between the two bicuspids. Feel with the finger for the mental foramen and inject about one mil and massage freely.

ZYGOMATIC INJECTION.

Palpate the zygomatic process of the maxilla, and, using a long needle, slide along, keeping close to the bone, going upward, backward, and inward, depositing the solution while injecting. In this manner the two posterior superior branches are crossed by the direction of the needle and anesthetized by the solution, desensitizing the molars and sometimes the bicuspids. It is advisable to inject in two directions to reach the superior alveolar branches. Inject two mils. The buccal part of the gum is anesthetized. Anesthesia occurs in about fifteen minutes, and lasts about one hour.

INFRAORBITAL INJECTION.

Palpate the infraorbital foramen and hold the finger on it. Retract the upper lip with one of the other fingers and insert the long needle into the canine fossa as high as the reflection of the mucous membrane allows, and until felt by the finger to be in the correct position. Inject slowly one mil, and press and massage with the finger to force the solution through the foramen. The incisors and cuspids will then be anesthetized. This injection is not advisable except in cases of abscesses or extensive surgical operations.

FAILURES AND ILL EFFECTS OF LOCAL ANESTHESIA.

There are failures and bad effects in all kinds of anesthesia. Local anesthesia today causes very little trouble in comparison to the failures with serious results of general and local anesthesia of past years. There are different sorts of failures: (1) True failures and ill effects. (2) Psychological effects. (3) Ill effects due to other sources.

CAUSE OF FAILURES.

(1) No, or insufficient, anesthesia.

(2) Undesirable symptoms during anesthesia.

(3) After-effects.

When insufficient anesthesia is obtained, the operator is often to blame. Sometimes he may fail because of insufficient knowledge of the anatomy of the part or improper apparatus or technique, or because of inefficient drugs, or possibly because of too large a percentage of suprarenin.

UNDESIRABLE SYMPTOMS DURING ANESTHESIA.

Pain during injection may be caused by—

(1) A solution which is too hot or too cold.

(2) Antiseptic drugs unadvisably added to keep the solution sterile.

(3) Solution non-isotonic with the blood.

(4) Injection into inflamed areas, such as an abscess.

In past experiences, in some cases I have found increase of heart action, sweating, or a queer feeling in the extremities, but since reducing the amount of suprarenin I have had no similar trouble.

In cases of tendency to fainting, tip the patient's head between his knees, give aromatic spirts of ammonia, strong black coffee, oil of camphor, or strychnin sulfate. Some of these agents should always be at hand.

Bromural is the most valuable preparation now used where sedative effects are desired. Bromural is administered in 5 to 15 gr. doses (1 to 3 tablets), regulating the dose according to the severity of the case and the vitality of the patient.

AFTER-EFFECTS.

Edema. Edema is a simple swelling caused by the infiltration of serum. It may be caused by solutions that are not isotonic, or by traumatism. Traumatism may be caused by multiple injections carelessly made, or possibly by directly injecting into a muscle. Edema, if no infection occurs, will disappear without treatment. The use of an ice-bag is sometimes indicated.

Psychological effects on the patient are largely controllable by the operator. Keep the patient's mind occupied and keep unpleasant things from his vision.

ILL EFFECTS FROM OTHER SOURCES.

Post-operative pain and inflammation may occur after an operation and may not be caused by the injection, but directly by the wound.

The causes may be—

(1) Septic wound.

(2) Wound infected during operation.

(3) Wound infected after operation by the fluid of the oral cavity.

Trigemin, aspirin, and pyramidon are useful agents to counteract pain originating from injections.

Procain is useful in many of our most troublesome operations, such as cavity preparation, removal of pulps in almost

any condition, pulp stones, abscess treatment, and in diagnosis. It is widely used now in crown and bridge work for fitting bands, cementing bridges, grinding and devitalizing teeth. Extracting is made easier, and root amputations, impacted teeth operations, treatment of fractures, and removal of cysts, tumors, necrosed tissue, etc., may be accomplished under almost perfect conditions.

I strongly advise the use of the X-ray in connection with diagnosis and treatment, and at the same time wish to emphasize the importance of the realization that the X-ray is but an aid in diagnosis.

I have by no means exhausted the subject, but hope that I have explained somewhat the uses and methods of procain as a local anesthetic; and wish to urge all to take advantage of the use of this valuable anesthetic which is at our disposal.

400 Marlboro st.

[See also *Discussion*, as reported under "Proceedings of Societies," this issue.]

A Suggestion for Making Splints in Two Separate Parts and Their Union by Means of a Lock.

By ALPHONSE N. MOUFANG, D.D.S., Philadelphia, Pa.,

FORMER INSTRUCTOR IN CROWN AND BRIDGE WORK AT THE DEPARTMENT OF DENTISTRY, UNIVERSITY OF PENNSYLVANIA.

MANY articles have already been published on splints and many suggestions have been given as to the quickest and the best methods of constructing them, but it seems as if necessity has aroused the profession to the desirability of finding some more practical method than any yet presented in order to do justice to our patients and to our profession.

The idea of casting splints was taken up and practiced in European countries about thirteen years ago, but it seems as if this method was not used on this side of the Atlantic, and nothing seemed to make its use imperative.

Dr. Aiguier has revived in the June issue of the Dental Cosmos the old but good method of casting splints, giving a detailed technique for the purpose; he does not, however, get away from the objectionable method of casting both splints in one piece.

If we wish to use cast splints we may just as well adopt the two-piece plan in making them, which is not only the quickest but also the most practical method. I wish therefore to present a practical and at the same time very simple method of casting splints in two pieces, and one which can be easily practiced by all dentists.

Major Robert Ivy has approved the idea of casting splints in two separate parts and afterward uniting them by means of a lock.

A fracture case sent from the Navy Yard and treated at the dental department of the University of Pennsylvania was the first case on which the lock device was used, and it seemed to be very satisfactory.

TECHNIQUE OF MAKING THE SPLINT.

I shall first give a short description of the technique of making the two-piece splint, and afterward a few suggestions as to the technique of making the different locking devices. Necessarily the first step is to obtain good impressions and casts, to reconstruct the proper articulation, and to mount the casts on an articulator.

We next burnish heavy tin (3/1000 gage) well over the remaining teeth. Existing undercuts are taken care of by allowing the tin to extend straight downward toward the gums and not burnishing the tin into the undercuts, cutting the tin close to the gingival margins of the teeth. Next we use Kerr's casting wax and burnish two sheets of it separately over the tin. If there are spaces caused through missing teeth, these should be bridged over with wax to the level of the occlusal surfaces of the teeth.

The amount of wax to be used in bridging such spaces is of secondary importance provided a sufficient amount is used to allow the metal to flow into the bridged space during the casting process and insure strength to the splint. The bite will be opened through the use of tin and wax as pattern.

The proper articulation can easily be re-established on the articulator after the splints are cast and the necessary windows finally cut in the metal, if not already made on the wax pattern. The small tubes which are used as locks are made over a piece of round nickel-silver wire, gage 13 or 14. A small metal extension is soldered to each, giving greater retention space in the tube for the wire key. The extensions have small cuts on the sides and ends to further increase retention of the key. The tubes are waxed in position in such a way as to allow the key wire to slip in and out of the tubes without difficulty.

Before removing the wax-and-tin pattern from the model for casting, a piece of wax about 2½ in. long and 1 in. wide is formed into a cylinder, one end flattened out and stuck with wax to one end of the wax-and-tin pattern at an angle of about 135°. Another wax cylinder of the same length but smaller in diameter is fastened with wax to the other end of the pattern at the same angle.

The thicker cylinder is used to make an opening in the investment through which to pour the metal, while the smaller one provides an escape for the air; it prevents air-bubbles in the metal and also enables the operator to accurately judge the amount of metal necessary to be used in casting. When the metal appears at the surface of the smaller opening, sufficient metal has been poured. The angle of 135° for the inlet affords an easier flow of the metal during the casting process.

As to the investment material, bird's gravel and plaster, or sand and plaster in the proportion of 1 to 2 may be used with advantage. The ordinary vulcanizing flask, or a small tin box without soldered joints, will answer the purpose, being sure that the tin box or flask is high enough to include at least 1½ or 2 in. of the two wax cylinders within the investment material, with about ½ inch exposed as a free end. The investment material is mixed rather thin, the wax-and-tin pattern moistened, and the flask filled about half full with investment material; then the tin pattern is filled out carefully with investment material and is placed in the flask, flowing the investment carefully all over it to avoid air-bubbles, then the entire flask or tin box is filled up with the investment material.

As soon as the investment material begins to harden, cut some of it away from around the thicker wax cylinder, making merely a depression for the fusible metal which is to be poured into the investment from this side. Have the wax cylinders perfectly clean in order to avoid any investment material or foreign matter getting into the mold while the wax is burning out, thus leading to failure. The flask is then placed on the stove over a very low flame, allowing the investment to dry out. Increase the heat gradually until the investment is perfectly dry, and then use the blowpipe to burn out the wax, observing the same rules as apply in casting gold inlays. After the wax is perfectly burned out, the metal is melted and poured into the larger hole until it appears at the surface of the smaller one. After the metal is poured in the investment allow the flask to remain in the same position until it has entirely cooled down. Compressed air may be used in order to cool the flask more quickly, but not before the

metal has hardened on the surfaces of the pour.

Splints cast as suggested require little time for finishing. The metal surplus on the two ends is sawed off clear to the splint. A good rough stone, or better, a rubber file, is used with advantage, followed by sandpaper disks to remove all the scratches, afterward using a hard brush and pumice, followed by a soft brush and chalk. The finishing and polishing does not require longer than from twenty to thirty minutes.

The material used in making the splint is Babbitt's metal, or equal parts of tin and zinc. The use of pure tin would not be advisable, as it is too soft to permit attachment of the locking device.

There are many ways of locking the splints together, and it requires but a few minutes to choose a device which will answer the purpose in an especially difficult case. I shall give here the description of three different devices by means of which it is possible to open and close the patient's mouth after the splint has been cemented in position.

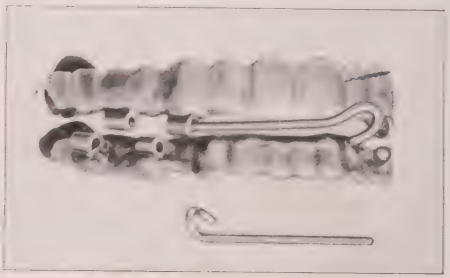
DESCRIPTION OF THE LOCKING DEVICES.

Fig. 1 shows an appliance for the upper and one for the lower jaw, both of which are cast. Each one has two small tubes on the buccal side, which are connected with the metal splint during the casting process. The two tubes of the upper appliance are placed in such a way that they fit in the intermittent spaces of the tubes of the lower appliance, forming one continuous tube when the jaws are brought into occlusion. The post over which the tubes were previously made and which exactly fits them is pushed into the tube, locking both appliances together as shown in Fig. 2. The post is bent at its mesial end downward and backward, forming a loop. This will enable the patient or dentist to secure a good hold on the lock if he wishes to open the splint; all that is necessary is to turn the small loop upward and pull the post forward. The opposite side has, of course, the same arrangement.

The post, as marked on Fig. 1, can be taken out entirely. It is placed in this position merely to better explain how easily the appliance can be handled.

Figs. 3 and 4 show another device on the same model. In this device a tube

Fig. 1.



which was made over a piece of nickel-silver wire of gage 13 or 14, was used, after which the tube was opened, using a saw and cutting about one-third of the tube away, then filing away as much of the tube as was necessary to allow the wire to fit snugly in the half-round tube. Four of such small half-round tubes are used to form a lock. The tubes are

Fig. 2.

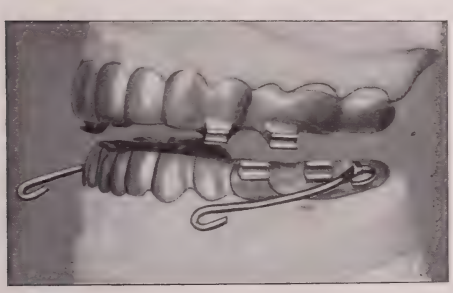
united to the metal splint during the casting process, and are placed in the manner explained in making the previous device. There is one point, however, that has to be especially borne in mind; that is, the floors of the four half-round tubes, two in the upper and two in the lower appliance, must be on the same level and placed in a slightly curved line forming part of a sector of a circle. The

post which closes the lock is bent on its mesial end in the same way as described for the previous device. The posterior

Fig. 3.

end of the wire is provided with a hinge arrangement which is fastened posterior to the last upper or lower half-round tube of the splint, allowing the post to move in the desired way.

Fig. 4.



It is advisable to attach the hinge arrangement on the opposite splint to the most distal half-round tube. The reason therefor is explained in its practical use. If the jaws are in proper occlusion the tubes will form one continuous half-round tube. All that is necessary for the patient to close the joint is to press the post against the tubes, when, if properly made, there will be heard a little click, indicating that the post fits snugly and locks the appliance. In order to open the device the patient presses or pulls the loop bucally and the appliance unlocks.

Fig. 5 shows another device, which is nothing more than a lacing together of the appliance of the upper with the appliance of the lower jaw. Three small hooks are placed on each appliance in the

Fig. 5.

same way as the previous ones, with a wire attached by a hinge arrangement posterior to the last upper or lower tube for lacing the two appliances together. The device mentioned is so constructed as to enable the surgeon or dentist to open the appliance if for any reason it should become necessary to do so, but will not allow the patient to do so.

ADVANTAGES OF THE TWO-PIECE SPLINT.

The advantages of a splint constructed with such a device as I here suggest are the following:

(1) The device will enable the patient to open and close the mouth without any help in a case of emergency such as may occur during transportation on sea or land.

(2) The device will be of great value during secondary bone-grafting operations.

(3) The device will enable the surgeon or dentist to easily open the patient's mouth as may be necessary during the formation of a sequestrum on the palatal or lingual side of the jaw, in case of suppuration, laceration of the tongue,

the soft palate, or any other part of the oral cavity needing special treatment.

(4) Such an appliance would permit the application of any disinfecting solution desired.

(5) A splint constructed with such a device would cause without doubt less mental depression because of the patient's being conscious that he can open the mouth if necessary.

109 S. 38TH ST.

The Conservation of Approximal Interspaces, Together with the Adjustment of Occlusal Relationships.

By L. ASHLEY FAUGHT, D.D.S., Philadelphia, Pa.,
PROF. OPERATIVE DENTISTRY, TEMPLE UNIVERSITY.

(Read before the Maryland State Dental Association, Baltimore, June 6, 1918.)

THE pathology involved in these operative procedures presupposes an intimate knowledge of the anatomy of the parts, and to make more effective what I shall say to you, a concise *résumé* is here made.

ANATOMY OF THE GUM AND ALVEOLO-DENTAL TISSUE.

I have never been able to become reconciled to the use of the term "gums," hence the use of word in the singular, to indicate an inelastic tissue characterized by hardness and immobility. With our thought directed to the approximal interspaces, we have largely to do with this tissue only as it rests upon the crests of the septi of the alveolar process. Its physiological import is defensive. Just beneath it and closely interwoven with it is that which I also prefer to speak of as alveolo-dental tissue rather than by the more usual terms of periosteum, alveolo-dental membrane, pericementum, etc. This is the tissue with which we shall be most concerned in studying occlusal relationships. It has a rich supply of bloodvessels and nerves. It is not a "membrane" in a strict histological sense, but is composed of fibrous and indefinite connective tissue. Its physiological import is to transmit nourishment to the teeth, to furnish elasticity and a cushion under force, and to act as a sling in which the teeth are held.

NORMAL OCCLUSION.

The upper third molar occludes with but one tooth, the lower third molar, and it is to be noted that its mesial cusps both buccal and lingual practically so occlude into the curved occlusal surface of the lower third molar that with each closure of the jaws the mesial surfaces of both upper and lower third molars are held locked in apposition against the distal surfaces of their respective adjoining second molars. Assistance to this interlocking device is given by the fact that the disto-buccal cusp of the lower molar is thus surrounded by the four cusps of the upper molar. A careful study of this the normal occlusion of the third molars is most important, for it would appear to be Nature's plan that the upper third molar should stand as a bulwark in direct occlusion with its opposing third molar, held by the cusping of the lower third molar from springing away from the second molar, and thus retaining closed the interspaces of all anterior upper molars.

In normal occlusion the lower second molar does not occlude at all with the upper third molar, while the upper third molar, as we have outlined, so occludes with the lower third molar that with every closure of the jaws the mesial surface of the lower third molar is impelled forcibly against the distal surface of the lower second molar, thus preventing any springing backward of the lower third molar and the consequent opening of the interspace, this force being felt all along the line, keeping all the interspaces in the lower jaw closed against the invasion of any extraneous matter during the process of mastication.

Two other points of like import are to be noted. With all the molar teeth the mesio-buccal cusps of the upper occlude in the buccal groove of the respective lower teeth which oppose two-thirds of their occlusal surface to them; and the mesio-lingual cusps of the upper molars occlude in the central fossæ of the corresponding lower molars. The mesio-lingual cusp of the upper molar is thus surrounded by the four cusps of the corresponding lower molar.

Out of this *résumé* each must grasp the beauty, simplicity, perfection, and harmonious arrangement of Nature's design to give the greatest penetrating, crushing, and grinding force in the process of mastication, and the care and provision she has taken to preserve that effective functioning. Note, therefore, the relationships of the inclined planes of the cusps, the mutual support of all the teeth in the arches, and how the septal gingival fibers in the gum and the alveolo-dental tissue bind the teeth more firmly together in the mesio-distal direction and especially hold the contacts of the teeth tight; how the plane of the margin of gum septum in normal condition rises to the point of contact of adjacent teeth; how mucus is the only substance deposited on this soft tissue, and how everything else slips upon it and falls off.

A clear grasp and noting of these things should, without further comment from me, lead us one and all to conserve approximal interspaces and adjust occlusal relationships when required; to be ever alert for the grinding of a cusp—an imperfect contour either occlusally or approximally, a poorly shaped tooth, or a misplaced crown, may change the approximal contact point of teeth in the immediate vicinity. Any depression about a tooth makes a place for lodgment of food or calculus deposits, and these in turn encroach surely and steadily upon gum tissue and finally upon the alveolo-dental tissue.

The pathological conditions which thus arise are among the most distressing to which the mouth is heir. With the interdental gum band, which normally protects the alveolar septi, forced out of its proper relationship and broken and destroyed, hypertrophied flaps of its remains are left on either side of an interproximal space, forming with the anterior and posterior teeth an open crater which soon seethes with decomposing material and infectious bacteria. Such is the descriptive picture of a condition more difficult to cope with successfully than even the most extraordinarily complicated case of dental caries.

IMPORTANCE OF PERFECT CONTOURS.

Perhaps a word further about imperfect contours occlusally and approximally may not be amiss. For many years dentists have filled teeth with but a single idea—the insertion of a stopping into a prepared cavity of decay, with possibly some consideration of the effect of the material upon the tooth tissues. A few, more thoughtful than the majority, have now and then intimated that there were other considerations. I think Professor Flagg was one of the first to emphatically state that a gaging of the *right amount* of filling material inserted was most important. While naturally an excess on the occlusal surface would surely if not quickly be resented by the tooth, a deficiency might pass and not be noted, the *right* amount being always that which restores the original contour of the tooth at the point filled.

This is as true of the approximal relationships as it is of the occlusal; and

when the cavity in this direction involves cervical plus gingival lines it becomes a matter which if ignored gives rise to undesirable pathological states in the adjacent gum tissue. As many of the cavities which the operative dentist is called upon to fill involve the approximal surfaces and extend to these relationships, I may be pardoned for asking that more consideration be given to this portion of such fillings.

Every teacher of operative dentistry, with the thought of inculcating methods of procedure which experience has taught to be essential to prevent recurrent decay, will insist that the line of juncture between filling and tooth tissue here shall not be just above or at a line of contact with gum tissue, but shall in every instance be carried below the free-margin line of gum tissue.

Professor Black touching this point says, "In the treatment of all gingival third and proximal cavities it is an established fact that no decay begins, and there is no recurrence of decay, in any part of the tooth covered by a healthy free border of the gum. Therefore, in all of these cases the free border of the gum should be pressed away and the gingival wall so cut that its margin will be covered by it when it returns to its normal position." Every thought, you see, of the operative dentist is to make perfect fillings which in turn, by the use of proper technique, shall preserve tooth tissue and thus prolong the life of useful organs. Not a word is said, not a thought given to the fact that these organs can only be serviceable when proper care is taken of the alveolo-dental tissue. All other effort must fail if this point be not considered, and fillings thus made lead the operative dentist into the domain of pathology.

I have mentioned the importance of gaging the right amount of filling material, and perhaps should say that the evil influence is greatest when any portion of the cavity margin is left uncovered, for then in place of the mechanical and other irritations of over-fulness there is a more serious mechanical irritation, that of the sharp cavity margin and the chemical irritation of disintegrating retained food magma and mucus.

Even when the right amount of filling material is used the pathologist has yet to consider the character of the surface of the filling material here placed to restore the lost normal state of healthy tooth tissue. I have noted that even when made faultlessly smooth there is an adventitious influence in the fact that it *is* filling material, the gum seeming to tolerate one kind more than another. I suppose that this is really true only in proportion as the material used has the capability of maintaining the faultlessly smooth finish.

GOLD FOIL RESTORATIONS.

So far as I know, gold is the only material possessing the quality of remaining placed, and that form known as non-cohesive gold the only one certain to continue indefinitely to reflect the painstaking work of the operator. With it can be produced a uniform solid surface and an adaptation to the cavity edge almost defying detection. The things which contribute to failure in producing perfect tooth form at this critical point in the filling are eliminated by its inherent qualities and capabilities, which beautifully lend themselves not only to the making of a perfect filling from the saving-of-tooth-tissue standpoint, but ever after from the pathological standpoint of being non-irritant to gum and alveolo-dental tissue.

AMALGAM RESTORATIONS.

Amalgam is not so satisfying; indeed, it is more than likely as the age of the filling advances, to become more and more troublesome in this respect. In dealing with amalgam as a filling material in these relationships, I am more and more impressed with the fact that the work is too frequently sloppily done, particularly in that portion of the filling which lies just below the gingivæ. In examining the work of others I have seen a great deal of this, as well as numberless instances where the filling was not

carried below the free margin of the gum, and the original condition has been such that the basal line of the filling was built roughly beyond the margin line of the cavity, producing at once the exact conditions of irritation.

This in a lesser degree will result where the amalgam either expands or contracts. It is very essential that great care should be taken in using this material to see that it is introduced by and with the aid of a matrix; and that the matrix, in its cervical relationships, should be precisely adapted to the cavity edge and immovably held in that position; so that when the amalgam is densely packed against the tooth tissue none of it shall protrude beyond the marginal line of the cavity.

Under the advanced conditions of manufacture, amalgam is becoming more and more a useful filling material. The chief difficulty in its use at the present time is the fact that the mind of the operator is predisposed to consider it as only a cheap filling material, and therefore he will not bestow upon it the care which it exacts in order to make perfect fillings. I do not make this statement in the spirit of criticism or captiousness regarding the operating methods of my brother operator, but because I am daily convinced that there is too much carelessness in this line of work, and I wish here to say something which shall at least tend to put a stop to this prolific source of irritation to gum tissue and to alveolodental tissue.

Amalgam is not only to be thus studied by us in those cases where it is used as a material for the entire filling of a cavity, but also in those other cases where its use seems to be called for especially, and where no other material is quite so available. I refer to those conditions in which, for many reasons, the tooth requires a plastic filling to be made with one of the various cements. My earnest conviction is that the cements have no place below the gingivæ; and that where their use is indicated as a filling material by the requirement of the case, this portion of the filling should be made with metal. The various amalgams naturally seem to be the most appropriate form of metal for this purpose, but should only be so used under the strict conditions of technique which I have just outlined.

Gutta-percha, though benign, yet by reason of its proneness to change its bulk is in the end a trouble-breeder.

The porcelain inlay presents alluring attractions to the operator as a material qualifying for just this desired service; but, to render this service, it must always be perfectly made and perfectly set—two requirements rarely met separately, and much less often obtained together, in the use of this material.

The plea which I am making here tonight is for the conservation of the health and usefulness of the alveolo-dental tissue, for, as has been very aptly stated by another, "A man in reality is only as strong as his peridental membrane."

Medical Arts Bldg.

[See also *Discussion*, as reported under "Proceedings of Societies," this issue.]

Dentist or Stomatologist?

By I. N. BROOMELL, D.D.S., Philadelphia, Pa.

(Read before the annual meeting of the New Jersey State Dental Society, Atlantic City, July 17–19, 1918.)

As defined by the standard authorities, a dentist is one who devotes his time to the "treatment and replacement of the loss of the natural teeth."

A stomatologist is defined as "one versed in stomatology," and to the latter term is added as part of its meaning, "the sum of what is known about the mouth." The literal acceptance of the definition applied to a stomatologist is misleading, because it fails to carry with it any reference to the possibility of disease occurring in the mouth cavity, and the treatment of the same.

Practically all medical dictionaries, all medical articles and terms in the various encyclopedias up to this time have been compiled or contributed by medical men, who perhaps thoughtlessly have failed to grasp the full significance of the term stomatologist; so for our purpose we are compelled to coin a new definition, which shall serve as a foundation for the arguments to be included in this brief paper. From the viewpoint of the dental practitioner it is believed that the following would be acceptable as a definition for the term stomatologist: "One who devotes his time to the preservation of the health and the treatment of diseases of the human mouth."

In the care of the mouth the question might properly arise as to the dividing line between dental and medical practice. In other words, Where should the dentist leave off and the physician begin? In earlier days, and in fact not many years ago, this was not a difficult question to answer. The work of the pioneer dentist was extremely limited and clearly defined, consisting in the extraction of teeth and the occasional application of a leech, and the actual cautery, as aids toward the alleviation of acute pains. This was sometimes accompanied by a crude attempt to replace lost teeth by mechanical means. With these as a foundation there was gradually developed a system of attempted tooth conservation which was the actual beginning of dentistry as a separate and distinct calling. From the more simple operations of filling, extracting, and inserting artificial teeth, there has been established a science which today stands as a most important factor in the conservation of the health, happiness, and comfort of civilized man.

The rapidity with which dentistry has advanced has been remarkable, but of all the important epochs in its history none can compare with the new relationship which has sprung up between dentistry and general medicine. Recent events have woven a fabric which will eventually bind these two professions into one harmonious unity of purpose, but that the best may come from this, progress must be made gradually and guardedly.

Nothing can do more to assist in this advancement than the willingness of the dental profession as a whole to assume the rôle of stomatologist, for by so doing we broaden our field of activity, and at once become masters of the situation, that is, the care of the human mouth. Much has transpired within the past few years to warrant such a move upon our part, and some of the more important of these may be related here.

The law passed on the last day of the last session of Congress and promptly signed by the President, places dental students on an equality with medical students, the former as well as the latter being permitted to enlist in the Enlisted Medical Reserve corps until they had completed their course and received their respective degrees. This was soon followed by a legislative enactment whereby a dentist could advance in army rank to the same extent as the medical officer. These actions soon resulted in the abolition of a separate dental and medical corps, by the inclusion of the former in the Medical corps, so that in the space of a few days the dentist in the army found himself advanced from a position of inaction and obscurity to one of signal rank, importance, and significance.

SYSTEMIC CONDITIONS AND THE TEETH.

While it may be claimed that the question of possible systemic disease through dental and oral infection was first agitated by a member of the medical profession, it is quite likely that the same thoughts had been brought out and possibly similar charges had been made by members of our own profession, this failing to make an impression chiefly because the author was perhaps less famous than Hunter, whose statements struck the popular chord. However this may be, it is an indisputable fact that, once being informed of its shortcomings, the dental profession has taken hold of the situation, deplorable and inexcusable as it may have been, and today we find ourselves working hand-in-hand with the physician to combat what in many instances heretofore appeared to be an unseen and misunderstood enemy responsible for no small proportion of human ailments.

Perhaps the most recent and the most noteworthy achievements to be eventually credited to dentistry are the investigations now going on to determine to what extent unerupted and impacted teeth are possible etiological factors in certain neuroses and epileptoid affections. Up to this time sufficient progress has been made to warrant the belief that many of these conditions have their origin from teeth thus abnormally placed, as the removal of such teeth has in at least two cases been followed by a complete clearing up of the morbid state.

As we look about and note the demand for oral hygiene and tooth conservation by municipal governments, large and small, and when we witness the benefactions of such men as Forsyth and Eastman and note the results that are sure to follow the establishment and endowment of the magnificent institutions founded by these gentlemen, we are compelled to admit the arrival of a new and broader dentistry.

Again, when we note the significant fact that the average general hospital of today feels its service incomplete without the installation and maintenance of a dental clinic, and that corporations and business firms are providing for the care of the mouth among their employees, we are again compelled to admit the arrival of a new and broader dentistry.

And again, if we transfer our thoughts to the beautiful city of Cleveland and there see with our mind's eye a stately mansion transformed to serve the needs of the Research Institute of the National Dental Association, once more a new and broader dentistry looms up before us. And if, furthermore, we were to inquire into the nature of the investigations going on under the fostering care of this organization, we should be gratified to learn that they are stomatological and not merely dental in scope, and that they, too, are along the lines of a new and broader dentistry.

Still another indication of the extension of our field of activity is to be noted in the numerous cases referred to us by the physician—until quite recently an action almost unthought of.

These are some of the things that justify the argument that the time has arrived for the dentist to step aside and permit the stomatologist to take his place. It has been previously stated that this change must be brought about gradually and guardedly, because we must not lose sight of the fact that while the

work of the physician and the dentist has recently become much more closely allied, they must, for the present at least, remain separate and distinct professions. Until quite recently the average physician has regarded diseases of the teeth as relatively of such minor importance as to be quite beneath his serious consideration. Until recently, even as a consultant in cases of systemic involvement, the average medical man proved unsatisfactory because of his lack of knowledge of or belief in causative oral conditions, and showed a disinclination or possibly inability to suggest any treatment for a complication possibly purely dental or oral in its origin. Happily this state of affairs is now undergoing a definite change, and it may be truthfully asserted that at no time in the history of dentistry as a profession has there been such a need for the assistance and co-operation of the medical profession as at the present; and to this may be added the satisfying declaration that at no time has the latter, as a class, shown more willingness to accommodate the former in this way.

RELATION OF MEDICINE AND DENTISTRY.

While dentistry is not a fully recognized specialty of medicine, and while it cannot be so long as the course of study and methods of practice include mechanics combined with operative and surgical procedure, it is an unquestionable fact that medicine has a controlling and wholesome influence over its younger brother, dentistry, and on this account the best humanitarian results can only be attained by one harmonious unity of purpose.

Forgetting dentistry for the time being, let us proceed to consider the broader field of activity, and what may properly be included within this field. It is now a well-recognized fact that we no longer speak of dental (or tooth) prophylaxis, because this does not appear to serve the purpose; it is now "oral" prophylaxis. It may be said of the mouth as well as of the body in general, that the tendency is markedly toward the prevention rather than the cure of disease. Recognizing the fact, therefore, that diseases of the mouth and teeth can best be controlled by prophylactic measures, this becomes the first duty of the stomatologist. The operative field of the stomatologist should include all tissues, both hard and soft, within the mouth cavity—the boundaries of which are, anteriorly, the lips; above, the hard and soft palate; below, the soft tissues forming the floor of the mouth, laterally the cheeks, and posteriorly that rather indefinite space, the fauces. As a conservative measure the question of prophylaxis is first to be considered. How shall we proceed, to keep the mouth clean or free from infectious material.

To accomplish this some method should be provided through which the mouth and teeth could be kept clean by personal attention. It would seem to be just about as inconsistent or ridiculous for one to depend upon the Turkish bath to keep the body clean as to be compelled to resort to the dentist to keep the mouth clean. It may be that the time is not far distant when the operation of cleansing the teeth will no longer be a detail part of our practice. But to bring this about, some radical changes must be made.

USELESSNESS OF MOUTHWASHES.

The writer is already on record as having some rather peculiar ideas about ready-made mouthwashes in general, ideas which in a general way make their use a questionable practice. In other words it is believed that the ultimate beneficial effect from the use of the average mouthwash is very much overestimated. The question comes to us frequently as to what mouth preparations are best and what virtue there is in these. It may be said that in the majority of instances a sort of stereotyped reply is made, without the varied pathologic possibilities of the mouth being taken into consideration, and disregarding the fact that a prophylactic which may prove of value in one mouth may be wholly ineffectual in another. The average ready-made mouthwash may be said to be just

about as effectual as a hair-restorer for the hairless head, or a magic ring for the cure of rheumatism. In making this statement the inference must not be drawn that there are no mouthwashes which contain the proper ingredients to make them act as they are expected to act in some certain cases, but their weakness lies in the fact that they are so promptly eliminated. In other words, they cannot be kept in contact with the parts upon which they are intended to act, for a sufficient length of time to be of any positive value.

There is need for improvement in methods covering oral hygiene and prophylaxis. The very fact that a clean tooth will not be affected by caries, with the equally significant fact that all teeth that are not clean do not decay, opens up a question for serious thought.

It might be stated with a good deal of certainty and without fear of positive contradiction that caries of the teeth is just about as prevalent in the mouths of those persons who give their teeth regular and systematic care as it is in the case of those who are totally indifferent in this regard. It may be that the question of predisposition and immunity is entirely responsible for this, and within certain limitations, inheritance, habits of life, diet, etc., are responsible for predisposition or immunity.

In making the foregoing statement, there is no desire to favor opposition to oral hygiene. Certainly the mouth, the gateway to the alimentary tract, should be kept free from unclean or septic material, and these remarks are therefore in the nature of a plea for normal conditions in the mouth, and if these normal conditions cannot be brought about physiologically or mechanically, then medicinal agents must be resorted to, and these should be compounded to suit each individual case, rather than to expect to find in any ready-made mouth preparation a panacea for all classes of mouth pathology.

APICAL INFECTIONS.

Perhaps the most important development in recent years, one which will eventually have much to do with transforming dentistry into stomatology and is largely responsible for our scientific, medical, and surgical progress, is the much-discussed question of apical infection, and the influence it may have as a possible causative factor in systemic disease. It is not my purpose to discuss the possibilities of this subject, other than to refer to the important fact that the successful management of these conditions calls for the dentist to step aside and permit the stomatologist to occupy the center of the stage. To fully understand and successfully treat these conditions means much more than cleansing and filling the root-canal, an operation purely mechanical, or dental, in character. It calls for much broader consideration. The histology, physiology, and anatomy of the affected part must not only be considered, but the bacteriology, pathology, and methods of physiologic repair must receive attention sufficient to warrant an attempt at diagnosis and prognosis. Disease originating in the apical space may extend the field of observation and operation to parts in the mouth far remote from the primary causative factor, the tooth itself, so that the operator is compelled to practice stomatology in place of dentistry, to successfully manage the case. While the dentist might be content to accept a radiographic diagnosis in a case of suspected apical infection, and while he might be satisfied with one set method of treatment in all cases, the broader view of the stomatologist would possibly cause him to hesitate before accepting the radiograph as positive in diagnosis, until he had carefully considered the case from the standpoint of general pathology and bacteriology. This argument is intended to carry with it the belief that in no case of so-called "blind abscess" should a positive diagnosis be reached from a radiograph alone.

The writer is already on record with the statement that no small percentage of the "rarefied" areas shown by the X-ray are *innocent scar tissue,* containing nothing in the nature of pyogenic or other pathologic organisms, and that they should be left unmolested for the best physical welfare of the individual,

unless their diagnostic suggestion be corroborated by a bacteriological finding. The day has arrived—in fact, it never should have been otherwise—when the dentist or stomatologist should interpret his own radiograph, and perhaps in a large percentage of instances this is done, the radioscope now having become an important adjunct in our modern office equipment.

This possibility of systemic disease arising from tooth and mouth infection has had to a certain extent the effect of letting down the bars between medicine and dentistry, and will no doubt eventually result in transforming dental practice into stomatology.

While this is all well and good, we are at the same time compelled to take exception to the too frequent action of the physician—that, viz, of advising the extraction of teeth without dental consultation. Stomatology, or dentistry, whichever you may choose to call it, can no longer continue to be party to the wholesale removal of teeth simply because the physician advises their extraction. There is but one remedy for this unfortunate situation; it simply means the expression by the physician of a more substantial confidence in the dentist, and the nearer we approach the field of stomatology the greater this confidence will become.

DENTAL EDUCATION TENDING TOWARD STOMATOLOGY.

It is an undisputed fact that the past few years has shown a remarkable tendency for dentistry to broaden into stomatology, and much of the credit for this is due to the constantly increasing curriculum adopted by the dental colleges. Included in this are many subjects formerly thought to be of value to the medical students only, but now are recognized as an essential part of the dental course. By this means the average dental practitioner of today has fortified himself with sufficient medical knowledge to enable him to intelligently take part in the discussion of many general medical subjects, and more especially those which belong or are closely allied to dentistry. It is with much regret that the same remarks cannot be applied to the general medical practitioner.

The failure of medical schools of the present day to instruct students even in the elementary principles of a branch of the healing art which the fathers of medicine did not disdain to teach, has long been regarded by dentists as a defect in the medical curriculum which should be overcome. While there can be no doubt as to the good results which might be expected to follow the adoption of the recommendation of the National Dental Association some years ago suggesting the inauguration of a course in oral hygiene in the medical curriculum, against such action will be urged the fact that the curriculum is already overcrowded and that the number of theoretical studies the student is required to pursue with more or less thoroughness, and the mass of technical detail in laboratory and clinical work which he is called upon to master, already tax to the utmost his mental and physical resources.

Great as is this obstacle to the inauguration in medical schools of a course in oral hygiene, prophylaxis, and fundamental dental pathology, room could doubtless be made for it, if it were deemed of sufficient importance, or were there any general demand for it on the part of the medical profession and the undergraduate body.

As a matter of fact, however, the interest manifested by medical students in dental pathology and associated subjects when taught in medical schools has never been of a very active or encouraging character. A few years ago an annual course of lectures covering that field, delivered in a prominent medical school by one of the most eminent dental teachers in the profession, was ultimately abandoned by him, chiefly because of lack of interest on the part of the students of the institution; and the course has never been resumed.

The fact that unhygienic conditions in the oral cavity are a prolific cause of grave systemic disorders can no longer be questioned, for it is manifest that the constant ingestion of septic organisms must in time overcome the resisting power inherent in healthy tissue and lead

to pathological changes more or less grave in character. These facts being now fully known to all well-informed physicians, it may be confidently hoped that even if overcrowded, room may soon be found in the curriculum of medical schools for at least the subjects of oral hygiene and prophylaxis. This being done, practitioners of medicine will be enabled to co-operate intelligently with those of the dental profession in their effort to arrest dental deterioration, and will be inspired to use all the weight of their potent influence with the community in support of measures looking to that end.

LINE OF DEMARCATION BETWEEN MEDICINE AND DENTISTRY.

The foregoing remarks are purely theoretical and problematic, therefore let us in conclusion consider the general subject from a practical point of view; and, first, as to the dividing line between medical and dental practice. If we continue to speak of a *dental* practice, then the line is clearly drawn. No physician would attempt to transgress upon the field rightfully belonging to the dentist. That is, he would refrain from filling, treating, or extracting diseased teeth. But suppose these diseased teeth are known to be the cause of some more serious condition in the mouth, and remote from them — into whose hands should such a case fall? Say, for example, through the persistent irritation of the tongue from contact with the jagged edges of a necrosed tooth, an epithelioma is developed. In such a case the dentist extracts the tooth, and the physician or surgeon operates upon the tongue. Or suppose the case to be the too frequent one of an external buccal sinus, originating, as these sinuses do in a vast majority of instances, from a pulpless tooth. In this case the dentist extracts the tooth, and if the sinus does not heal the patient is usually referred to the physician for further treatment.

Many cases of acute and semi-acute inflammation of the hard and soft palate, tonsils, and fauces have their origin in defective teeth, yet how often is a dentist called upon even to assist in arriving at a satisfactory diagnosis? Necrotic conditions of the maxillæ are perhaps in a majority of instances of dental origin, yet these cases are usually treated on the "fifty-fifty" plan, *i.e.* the dentist getting fifty cents and the surgeon fifty dollars.

While the modern textbooks on dental pathology all include as important the subjects of stomatitis and cancrum oris, it is the exception rather than the rule that the purely dental man attempts to treat these mouth conditions.

It is quite true that in many cases of facial neuralgia the dentist is consulted, with the result that frequently the seat of the trouble proves to be a tooth lesion, but if this fails to be the case, if an examination of the teeth results in a negative finding, back goes the patient to the physician or surgeon with the possibility of a resection operation as the only means of relief.

It has perhaps never been definitely decided, legally or otherwise, just what liberties or liabilities the degree D.D.S. confers upon one possessing this title. There is an unwritten law to the effect that a man to specialize as an oral surgeon must have first of all the M.D. degree, the ideal oral surgeon possessing both degrees, the M.D. and the D.D.S. This is doubtless due to the fact that in the past the dentist appeared content to confine his operations to the teeth alone, all other operations in the mouth being referred to the general surgeon. It is believed that there is an important place for the man who specializes as an oral surgeon, and the present war has proved this beyond a question of doubt, but there is no sound reason why the D.D.S. degree should not protect its possessor sufficiently to permit him to perform any operation in or about the mouth.

The one thing most likely to handicap a man having the degree of D.D.S. is the significant word "dental," and this part of the title will disintegrate just as rapidly as we choose to have it do so, by our recognition of a new and broader field of operation—the future degree conferred to be D.S. (Doctor of Stomatology) in place of D.D.S. (Doctor of Dental Surgery).

FLANDERS BLDG.

Nature's Tolerance and Compensating Adjustments as They Relate to Oral Restoration.*

(II.)

By JAS. KENDALL BURGESS, D.D.S., New York, N. Y.

(Read before the Maryland State Dental Association, Baltimore, June 5-7, 1918.)

AT a recent meeting of a state society there was shown in the progressive clinic a removable bridge, part of a system in which the burden of the entire perpendicular support of the bridge is placed upon the gum, the abutment teeth serving merely to hold the bridge in position. The system is based on the expressed belief of the clinician that Nature has not provided the human tooth with strength beyond that sufficient for its own needs, and that it is not wise or fair to place a greater burden upon it. This is taking a matter to which it has been my privilege to call attention heretofore, to the other and unwarranted extreme. It is an example added to many others of a tendency to circumscribed vision and shallow thinking which characterizes so many of our profession—for that matter, I presume, all professions—and it suggests to me the title of my paper, "Nature's Tolerance and Compensating Adjustments as They Relate to Oral Restoration."

A crying need of the dental profession—as, no doubt of all other professions—is for balance, perspective, the saving grace of a correct sense or estimate of relative values. We are prone to look at one thing so long and so intently that its image becomes fixed in the vision and interposes itself between our gaze and everything else to which our attention may be called. The average specialist or man with a hobby is like strychnin or atropin. He is tremendously concentrated and needs an immense amount of dilution before he is fit to be taken into the system of general practice. Common sense is all too rare a quality. We hitch ourselves to a theory, and lacking the ballast of a practical rationality it develops wings and soars away with us into the ethereal blue of an impractical idealism filled with all manner of inconsistencies.

Here, for instance is a striking example of inconsistency: A tooth well imbedded in the bony structures and formed and anchored for the express purpose of performing the function of mastication is considered not to be able to bear the burden of any additional service; so, by way of sparing the tooth, the whole stress of mastication by the restoration is put upon the gum tissue, which, in the very nature of things, was not designed to bear any of it. "Circumstances alter cases," and Nature has a marvelous way of adapting herself to circumstances. If she were intolerent and insisted on the absolute normal in anything, few of us would be here to tell the tale. But she probably has no established normal from which she has not departed and will not tolerate departure in some measure. Her compensations are matters of common knowledge and observation.

The deaf, for example, frequently acquire great facility in lip reading through exceptional development of the keenness and quickness of the sense of

* [This is the second paper of the series by the author on the fundamental principles of oral restoration. The first paper appeared in our September issue, at page 785.—ED.]

sight, and so are able to converse almost or quite as well as if they could hear. The blind develop a wonderful sense of touch. I have seen one totally blind tell colors with great accuracy by feeling the objects with his fingers. These are conspicuous examples, but there are many similar instances of Nature's losses or impairments and her efforts at compensation. In truth, there are few organs or tissues that she has not been able at some time or other to dispense with or bear great alteration of, perhaps both in form and function, and to compensate the possessor for his loss by increased efficiency of some other organ or tissue.

What is true of the organism in general is true of the oral cavity and its environment, in which our concern is more particularly centered. So my friend the clinician is in error. The gum, which Nature probably never intended for the purpose of supporting man-made dentures, can adapt itself to the requirements within certain limitations if circumstances necessitate it. On the other hand there is no reason why a tooth with normal and unimpaired anchorage should not be able to take up a part of the burden of its lost fellow if the additional burden be correctly adjusted and within proper limits.

The question is: How far may we expect her to go in bearing these losses or modifications and the additional burdens they entail, what compensating adjustments may we reasonably expect of her, and to what extent and by what means may we be of aid to her in her effort to repair or compensate for the deterioration wrought by time and service, the ravages of morbid processes, or the damage done by violence or accident? And let us see if there are not some lessons we may learn from Nature and her attitude toward the perversions forced upon her and the destructive effort of her transgressors and despoilers, so that when operative interference becomes necessary we may act intelligently and as far as possible in harmony with her own plans and purposes.

First, considering the tooth as apart from its relations. Perhaps the most commonly met with transgression of Nature's plan for the individual tooth is caries. It is a well-known fact that any disturbance even to the enamel is taken cognizance of by the pulp, which undertakes to protect itself by throwing out secondary dentin as a bulwark of defense against the encroachment of the enemy. Here is a very familiar example of Nature's compensating adjustment to conditions as they arise; and how successful she is in accomplishing it is attested in the experience of every practitioner who observes teeth retaining their vitality and health in many instances even though a considerable portion of their substance be destroyed by caries. Only less common are erosion and attrition, and the same tolerance and effort at adjustment to meet the altered conditions are constantly to be observed.

These processes, however, have small beginnings and are more or less gradual in the progress of their encroachment toward the pulp, and that organ, taking cognizance of their very beginnings, has opportunity in many cases to build up against the invasion, and gradually withdraw to a position of safety. The question has been raised as to the safety of the pulp in cases where the sudden removal of tissue by grinding and cutting becomes necessary in the preparation of teeth for bridge anchorages or abutments, seeing that the pulp is taken unawares and has not the same opportunity for protection.

RESISTANCE OF THE PULP TO OPERATIVE MEASURES.

In discussing the comparative danger to the pulp of the gradual process of decay and the sudden operation of tissue removal there are three things to be said relative to caries and the remedial measures for its correction. First: That penetrating the dentin far deeper than any operator goes in cavity preparation are micro-organisms which precede the actual breaking-down of tissue—at least to an observable extent. Second: That in removal of decay and cavity preparation there is also much sudden and precipitate removal of tissue just as there is in abutment preparation. Third: That this operation encroaches much

nearer to the pulp in many cases than does that for abutment preparation. If experience and observations have shown, as they have, that the pulp resists all these influences and encroachments and remains vital throughout the life of the patient, it needs only the application of common intelligence to force the conclusion that it will bear the strain of tissue removal by operative procedure. And there is ample data in the experience of every operator, who has cared to observe, to demonstrate that these conclusions are founded on facts.

There are some timorous souls among us, however, who are overburdened with a sense of responsibility for Nature's welfare, and fearful lest she be unable to protect herself. Being actuated by motives in kind with those of our generous-hearted and philanthropic birth-control specialists and advocates who would stand between God and a misused world to ward off His injustice and administer these affairs according to their own superior judgment—these pseudo-Solomons, usurping Nature's prerogative of death-control, destroy unoffending pulps at will, and because they adjust the rubber dam, sterilize the sword and the dirk with which the murder is committed, pack gutta-percha to the end of the canal, and take radiographs to show the mechanical precision with which every step of the assassination is conducted, they put on the virtuous airs of benefactors and talk learnedly of technique and asepsis.

The fact that all pulps are not equal to the increased effort and some of Nature's attempts at compensation and adjustment come to grief, offers no excuse whatever for the wholesale and indiscriminate slaughter of the innocents advocated and indulged in by these wiseacres to forestall the pathological process they claim always to foresee, but which, like most of our troubles, does not occur in probably the vast majority of cases.

Leaving the tooth as an individual for the moment, there is an interesting reciprocal relation of the teeth of which I desire to speak. A study of the teeth and their relations reveals the individual tooth as having a free single protruding end of varying size and shape to meet Nature's requirements, and a single or multiple submerged end, as the case may be, imbedded and anchored in the bony structures of the jaw for retention and support, and that the free ends of the teeth in the opposing jaws bear a relation to each other which we describe as occlusion. These tooth-ends with their occlusal and anchorage relations have a direct bearing each upon the other, both as to tooth service and individual tooth welfare.

EXAGGERATED IMPORTANCE OF OCCLUSION IN BRIDGE WORK.

The chief function of the occlusal relation is the service of mastication, which in turn is the initial stage in the process of digestion. There is no doubt that in the normal occlusal and anchorage relations as Nature has planned them is to be found the highest degree of efficiency and the greatest compatibility with individual tooth welfare. The departure from the normal in occlusal relations, however, is so prevalent and so varied, frequently so aggravated and in so many instances never corrected, that we are forced to consider Nature's behavior toward these defective relations. If perfect masticating efficiency depends upon perfect or normal occlusal relations, it must be conceded that efficiency is reduced in the measure in which we depart from these normal relations, whether the departure be due to malocclusion or loss of the occlusal surfaces through deterioration or tooth removal, until in the edentulous mouth it ceases.

That Nature does not hold all of our organs and tissues to strict accountability, but gives much latitude in compensating adjustments, is patent to every lay and professional observer. It is no uncommon thing to see those possessed of disarranged or disorganized dentures with impaired occlusion, or lacking any for that matter, retain full physical vigor and come to ripe age. So much for Nature's compensations in the case of occlusal relations and function.

When, also, we come to consider occlusal relations and individual tooth wel-

fare, we find the same tolerance on Nature's part—that whereas the stimulus to the teeth and tissues afforded by normal function of the teeth in normal occlusal relations is conducive, at least theoretically, to the highest state of tooth vigor, teeth in abnormal occlusion or entirely out of occlusion in many instances, retain their health and vigor in high degree. And these conditions pertaining to both systemic and tooth welfare, while not universal, are so frequent, so prevalent, that I am forced to the conclusion that of all the normal relations of the teeth the so-called normal occlusal relation is the least important.

No reflection is intended here upon the ideals and the splendid attainments of the orthodontist; but it must be remembered that he has an opportunity not vouchsafed to the worker in restoration. He is presented with a foundation intact, and his efforts are directed merely toward a rearrangement of that foundation. Likewise the prosthodontist, who gains all the support for his superstructures from the firm gum tissues overlying the bony structures of the jaw, has an equal opportunity to produce normal occlusion. But the bridge-worker is presented always with an impaired foundation. His problem is to ascertain the extent and character of its impairment, and the measure of proficiency inherent in its present status, and to provide for only so much service as that measure of proficiency is capable of producing.

Now let us come back to a consideration of our reciprocal tooth-end relations. Any occlusal relation that produces efficiency or service requires for that performance of service a commensurate stability or limitation of movement of the teeth, so that the free ends when brought in contact for function will glide against each other and not drag either tooth bodily out of its normal range of movement, a condition productive of trauma and a relation which we describe as traumatic occlusion. It is this stability or limitation of movement that gives the tooth its proficiency or ability to withstand the service of mastication—and this is the result, of course, of the relations of its anchored end, being embedded as it is in the bony structures of the jaw. When this relation is interfered with and there is not left commensurate anchorage of the tooth, there cannot of course be sufficient stability to withstand the grinding of the surfaces of the occluding teeth against each other, and the dragging of the teeth out of the range of their normal movements, with consequent trauma and lessening of their proficiency, will be the result.

Here, then, is an interesting cycle in which is shown not only reciprocal occlusal and anchorage relations, but in addition a corresponding relation between tooth welfare and tooth efficiency. Upon the occlusal relations of the free ends of the teeth depends the welfare of their anchored ends, upon the welfare of their anchored ends depends their proficiency, and upon their proficiency depends the efficiency of their free ends, so that where the welfare of the anchored ends is impaired the efficiency of the free ends must of necessity be reduced. The fact that teeth are in so-called normal occlusal relations does not insure normal efficiency. The vital factor in tooth efficiency is not the relations of their occlusal ends, but tooth welfare as determined by the relations of their anchored ends. And this and proficiency are not necessarily fostered by so-called normal occlusal relations, which in the case of reduced anchorage may be productive of trauma, and trauma in the foundation is always absolutely and unequivocally to be avoided at whatever expense to the occlusion.

The relations of the free ends of the teeth is the established and pivotal point in the case as it comes to us, and the welfare of the anchored ends is the goal we must seek, the condition we must bring about, because without tooth welfare there can be no tooth efficiency. The welfare of the tooth is the measure of its proficiency, and its proficiency is the measure of its efficiency.

In those cases where restoration becomes necessary, it is plainly to be seen that we have no right to expect normal efficiency from minus proficiency, and we have no recourse but to fall back upon Nature's tolerance—which, as we

have shown, is an ample dependence. This we do by accepting the highest degree of tooth welfare to be procured in a given case as the basis of the operation, judging from that the proficiency of the foundation, and the establishment of such occlusal surface relations in accordance therewith as will produce only such degree of efficiency as is commensurate with the available tooth welfare and proficiency. Anything beyond this will be productive of trauma, resulting in impaired tooth welfare, reduced proficiency, and lowered efficiency, and this pernicious cycle will continue its destructive rounds until exfoliation results as the price we pay for our folly. So I repeat that we must aim at tooth welfare and depend upon Nature's tolerance of the frequently resulting and necessarily reduced efficiency.

We are familiar with the changes that take place in the shades of teeth as age increases, that Nature's harmony may be preserved. We note the ease with which the tissues of the oral cavity that so quickly discover and resent the invasion of a loose bristle from the toothbrush, learn to tolerate oral restorations of any size, even to the full dentures. And we know with what facility matters of taste and speech, and other functions of the teeth and tissues, adjust themselves to these new conditions—notwithstanding that one patient did refuse to pay for full upper and lower dentures because he was not altogether pleased with his efforts to "say 'success' successfully." These things need no enlarging upon, but I have laid emphasis on the relation between tooth welfare and tooth efficiency because I believe that our failures at this point have been the cause of many ruined dentures and wrecked opportunities.

ORAL SANITATION.

Passing on from the relations and functions of the teeth, we come to the care of the oral cavity. One of the matters that comes most frequently to our attention in the daily grind is that of the unclean mouth. It is interesting to us at this point because of the lengths to which some practitioners have gone and are going to correct it and to establish so-called sanitation. It is well to inquire for a moment what is meant by the term "sanitation." If it means absolute and continuous freedom of the oral cavity from all the products of secretion and of accretion, it may as well be said once for all that it never can be maintained; few could survive the age of dentition! This must be patent to every observer of the oral cavity and its contents, of the forms and relations of the teeth and tissues, and of the uses to which they are put. It is true of the normal mouth—at least the nearest we find it, in this age of civilization, to what Nature designed it to be; and it is increasingly true in the measure in which we depart from the normal.

In view of this it is very evident that Nature expects and provides against some accumulations in the oral cavity. Her tolerance varies, no doubt, with the individual systemic resistance, which is influenced by many circumstances. What the maximum is, as revealed by the combination of advancing age, vigorous health, and oral uncleanliness that are wont to come under our observation, must be appalling to those of us who profess to believe that systemic prophylaxis lies in the way of perfect oral cleanliness.

We make a great to-do about unclean mouths, but there is serious question about the deleterious effects of loose food débris in the oral cavity. Some of the most unclean mouths to be observed are those of people in advanced years.

The profession has long nursed the fallacy that a clean tooth never decays. How shall we know? Was there ever, since the world began, a tooth that was always clean—if ever clean, for that matter? Certainly the degree of uncleanliness does not in any degree regulate the amount of decay we find in the mouths of our patients. Any uncleanliness that comes into contact with the blood stream is likely to contaminate it and is unsafe. But I am seriously of the opinion that very little pathological disturbance is traceable to mere accumulations of food débris in the mouth where any attempt at cleansing is maintained. The local congestion consequent

upon the accumulation of tartar about the necks of teeth far outweighs in importance the systemic effects of food débris in locations where it does not come into contact with the submucous tissues, and consequently with the blood stream.

It is not my purpose in this paper to attempt to establish any definite degree of oral cleanliness or lack of it as Nature's normal or the limit of her tolerance, but simply to claim that it does not mean sterility or absolute freedom from accumulations on the one hand, any more than it means unlimited filth on the other. And there is no reason why any sensitive soul should be shocked at such an admission. These are facts within the observation of every practitioner. The stating of them implies no carelessness in matters of oral sanitation, and to refuse to acknowledge them is merely to pose.

Those enthusiasts on the subject of perfect oral cleanliness who are engaged in the work of restoration do not hesitate to remove pulps and excise tooth crowns indiscriminately for the purpose of securing anchorage for removable bridges. Thus they rob Nature of her vital tissues, destroy functions and alter important relations with the rest of the organism—all in an effort to force upon her an unnatural freedom from extraneous matter, in the doing of which they endanger her blood stream—the supply conduits, where cleanliness is next to imperative and pollution may mean injury or death—in order to spare the alimentary tract, at least one function of which is that of the sewer! Here are shown again the possibilities of evil as a result of over-zeal for one phase of our effort. Instead of compensating for one disadvantage by offering a corresponding advantage, Nature is sacrificed in a very important direction, and the welfare of her whole systemic economy jeoparded to establish an immunity far beyond her needs and requirements in another.

If our productions are properly made and adjusted they will be as amenable to hygienic effort on the part of patient and operator as are the surroundings amid which they are placed. Nature will not expect or require more, and for man to attempt it is a foolish waste of time and effort. There is no doubt that Nature has established a normal in conformation, arrangement, anchorage, and relations of the teeth and tissues of the oral cavity, and that tooth welfare, tooth efficiency, oral sanitation, and oral prophylaxis are all to be found in the largest measure in Nature's plan; but in many cases that come under our care there has occurred such radical departure from Nature's evident purposes as to make any possibility of realizing them a forlorn hope.

I protest that I am not callous to the needs and requirements of the oral cavity in respect to any of the matters concerning which I have written, nor careless in my efforts to obtain the best possible results commensurate with the difficulties under which we labor. Mine is an introspective effort to meet face to face conditions as they exist, to lengthen vision, broaden perspective, and by cultivating a saving sense of relative values to seek the greatest commensurate measure of proficiency and efficiency and avoid foolish and dangerous extremes and sacrifices that bring no commensurate compensating advantage. It has been the design of this paper to point out the unwisdom of fixing upon one object in Nature's plan, making a fetish of it, and sacrificing everything else that she holds dear and worth while to the accomplishment of that one object.

It should be patent to every thinking practitioner that all the interests of the teeth and tissues of the oral cavity, individual, relational, and functional, will be better served by following a plan of compensating adjustments so that no one part or relation or function or feature will suffer all the sacrifices, bear all the burdens, or receive all the blessings, but that there shall be a just and equable distribution among all the parts and relations and functions so that the highest average of welfare and efficiency may be attained and maintained. Thus will the systemic welfare, which is our highest concern and our greatest responsibility, be the better served.

149 Broadway.

The Treatment of Pyorrhea Alveolaris.

By C. E. HINES, D.D.S., Memphis, Tenn.

(Read before the annual meeting of the Mississippi State Dental Association, Meridian, April 16 and 17, 1918.)

CAN pyorrhea be cured? This question has probably been asked more frequently than any other ever presented to the dentist. It can be answered neither in the affirmative nor in the negative without qualifications. To the individual affected with this disease it is a vital question, and one that merits a conservative answer. No dentist has the right to answer this question until he has studied every phase of the particular case.

It should be explained to the patient that the word "cure" as applied to any disease is but a relative term. In pyorrhea it does not mean that the lost tissue, gingival, pericemental, and alveolar, can be restored, but it does mean that the teeth treated can be made healthy and comfortable. Teeth that cannot be restored to this condition should be extracted.

Whether or not pyorrhea can be cured in the above sense depends, first, upon a careful diagnosis; second, upon the dentist's ability to treat the case in hand; and third, upon the willingness of the patient to co-operate until results have been secured. In other words, it is a double personal equation, depending upon both the operator and the patient.

We should be careful in our promises to patients. As a rule, dentists promise too much. They promise this and they guarantee that, until the majority of patients want a promise that whatever is done in their mouths will last until they enter the "promised land." A truly professional man cannot promise anything except to do his utmost, and that "utmost" should always have as its prime object the conservation of the patient's health. If we do this, we will get a new vision of dentistry. Dr. Price calls this new vision the "infection sense." When a dentist gets this infection sense, which is nothing but common sense, it changes the whole course of his thinking. He begins to look at the mouth from an entirely different angle. Things heretofore considered to be of small consequence assume grave proportions. He no longer tells his patient that an abscessed tooth is of little consequence, and that pyorrhea cannot be cured, but to just worry along with it until the teeth drop out.

Dr. Hartzell says that infection from the teeth and tonsils causes ninety per cent. of all heart disease; that fifty per cent. of arthritis and iritis is from the same cause; that kidney troubles are frequent from mouth infection. Cut these figures in half, and we would still have enough left to cause all of us to do some hard thinking.

Before entering into a discussion of how pyorrhea should be handled, let me say that the reason so many people who have otherwise had good dental attention have pyorrhea is because you and I have failed in our duty to use preventive measures when the opportunity presented. We have been content to clean teeth in a haphazard sort of way, overlooking lesions in the mouth directly responsible for future pyorrhea without making any effort whatever to correct them. We have laid little stress on the fact that it is just as necessary to thoroughly clean out the mouth once or twice a year and brush the teeth three times a day as it is to take regular baths and put on clean clothes. The public has

been taught to think that the cleaning of teeth is principally done for the sake of appearance, and that one dollar is a fair price for the effort. Yes, some of us have gone so far as to tell patients we would do their work for a certain price and not charge for the cleaning of the teeth. Is it not a shame that the most important and difficult operation in dentistry should be dragged in the mire in such a manner? I am free to confess that I have never yet cleaned a set of teeth to my entire satisfaction, even in a mouth apparently clean.

DIAGNOSIS.

The essential point in the treatment of this disease is diagnosis. Study, first, your patients: Determine whether or not they have enough pride in their make-up to really want a healthy mouth. Many people are so indifferent that it takes an open grave staring them in the face to move them. The best kind of patient is one that has been put through the third degree by his dentist. He usually has a broken and contrite spirit, and his mind is in a receptive mood for advice. He does not haggle over the point of whether or not pyorrhea can be cured, but is anxious to get the benefit of any treatment that will remove the infection from his mouth; more than that, he is willing to pay a fair price for the work. He has gotten out of the one-dollar class.

A thorough mouth examination should be given in a definite manner. Observe the mucoid plaques or films on the teeth. This is best done by using the staining solution formulated by Dr. Skinner of Chicago. Dr. Hartzell says this plaque or film contains 47 per cent. streptococcus viridans; that gingivitis is a streptococcus viridans infection. This emphasizes the importance of the plaque and of gingivitis in their relation to infections. It would seem that it is possible for a person to get just as much infection from this film on their teeth and from gingivitis as it is from any other source.

Observe the amount of salivary deposits on the crowns of the teeth.

Observe any malocclusion of the teeth. I believe more pyorrhea is caused or aggravated by malocclusion than any other one cause. Certain it is that no results of lasting value will be obtained until this condition is corrected.

Note all ill-fitting crowns and bridge work. The most hopeless case of pyorrhea to handle is one where the mouth is filled with crown and bridge work.

Note the condition of fillings as to contact, occlusion, etc., and all cervical cavities.

Radiograph devitalized teeth and all areas where deep pockets are suspected.

After all these conditions have been noted we are in position to make a more definite prognosis.

SURGICAL TREATMENT.

Treatment is then begun by polishing the crowns of the teeth. I am thoroughly convinced that the logical place to begin the treatment of pyorrhea is on the tooth's surface. The patient should be shown the amount of bacterial growth that has accumulated, and his attention directed to those areas which need the greatest daily care.

The next step is the removal of all salivary deposits. Any form of scaler desired can be used for this.

When this has been done we are ready for the true surgical procedure of removing the necrotic membrane around every tooth. This is a delicate operation and should be performed with great care. I am firmly fixed in my opinion that a scaler should never be introduced into a pyorrhea pocket. The only instrument to use is the file. Scalers scratch and etch the surfaces upon which they are used, while the file leaves a smooth surface, so desirable in this work.

After completion of the surgical work the mouth should be allowed to rest for at least two weeks. At the end of that time we are in position to observe the effect of our surgical treatment. The teeth should be thoroughly polished again with porte-polisher and orangewood point. The contact points should be polished with tape coated with flour

of pumice. Then a final high polish with "carmi lustro" should be given. I do not hesitate to repeat the surgery wherever inflammation seems to be present.

I try to spend as much or more time on the polishing of the teeth as I do on the surgery. I rarely use the dental engine in polishing, but depend upon porte-polishers and orange-wood points and tape. I re-polish the teeth once a month or sometimes every two months, as the case may indicate. After we have seen a patient for a year in this way we are in better position to judge how often it is necessary to polish the teeth to keep the mouth free from disease. It is also to be hoped that after a patient has had the pleasure of having a clean mouth for a year he will be in a frame of mind to co-operate with the dentist in his future efforts.

I believe in the use of very few drugs in the treatment of pyorrhea, although I use drugs when conditions that warrant it arise. It can positively be said that drugs will not cure pyorrhea, though they have a very definite place in its treatment. In cases where the teeth have small gingival cavities and roughened areas I use a 10 per cent. solution of nitrate of silver; this I paint over the surfaces of the teeth. It is especially valuable where sensitiveness exists from instrumentation. It does not discolor sound tooth structure, but will produce discoloration where there has been disintegration. The persistent application of this remedy with frequent polishing of these areas gives better results than an attempt to grind or smooth them with stones.

Antiseptic precautions should always be taken before instrumentation for the removal of necrotic membrane. The mouth should be sprayed with a normal salt solution and the gums painted with some of the iodin preparations.

Pyorrhea patients should be taught to avoid the use of strong mouthwashes, antiseptic tooth-pastes, etc., and dentists should cease recommending them.

I instruct my patients to rinse their mouths thoroughly after each meal with a mouthwash composed of a warm normal salt solution to which is added a tablespoonful of lime-water. Patients are instructed in massaging and in the Fones method of brushing the teeth. You must give the patient something definite to do and insist on its being done.

Fixed bridge work should rarely be used in a mouth affected with pyorrhea, the only exception being where small bridges are employed in the front of the mouth. There is just as much sense in cementing on a cork leg in an attempt to make it a permanent part of the anatomy as in cementing bridges upon teeth that have been affected with pyorrhea.

Dr. Rhein is authority for the statement that the English outlive the Americans, and that they do so in no small measure because the latter wear septic bridges in their mouths, while the former are less addicted to this possible source of danger.

The splinting of loose teeth is a failure. If a tooth cannot be tightened it should be extracted. This is easily proved by radiographing a case where the teeth have been retained by the use of splints.

The treatment of pyorrhea is a matter of detail and technique. The patient must be warned that periods of neglect will only result in disaster; that the greatest care must be exercised in keeping the mouth clean; that constant vigilance is the price of success. I feel sure that both patient and operator will feel amply repaid with the results obtained where a conscientious effort has been made.

DISCUSSION.

By Dr. Wm. R. Wright, Jackson, Miss.

Having been closely associated with the essayist during the greater part of his college course and for several years immediately following, I had a splendid opportunity to study the man and his methods. He has always been a close student, and he is never satisfied until he has studied his subject exhaustively

both from a theoretical and a practical standpoint. His interpretation of a given subject has always been practical. I want to commend the frank and lucid manner in which Dr. Hines has handled the subject of pyorrhea.

He gives the most practical ideas for the general practitioner that I have ever heard from a specialist. He has eliminated much of the red tape and high-sounding phrases that are often used, apparently to catch the ear of those who have paid little or no attention to the most prevalent and dangerous lesion of the human body.

My discussion will not be along the lines followed by the specialist, but rather from the viewpoint of the general practitioner who desires to serve a *clientèle* which is geographically and financially removed from the specialist's field of activities. In the beginning I wish to go on record as favoring the specialist in pyorrhea, when he can be reached conveniently, but the small-town dentist is deprived of this privilege, and we must shoulder this burden to the best of our ability.

Dr. Hines states that at least three things are necessary in the treatment of pyorrhea; correct diagnosis, skill of the operator, and co-operation of the patient. If these three points could be burned into the brains of every dentist in Mississippi today our stock would take a sudden leap upward. For a number of years my hobby has been to know an unsavable tooth when I see it. We lack the skill to properly scale and polish the necks of teeth, and we fail miserably to convince our patients that we really mean business, and therefore we do not get the real co-operation which is so essential in the treatment of pyorrhea.

I cannot agree with the essayist in regard to medication. Personally I have never been lured very far by the claptrap "quick cure" remedies; yet I have tried out almost everything that has been offered for a number of years, to see what value they might have. Each experiment has convinced me more thoroughly than before that the only real hope up to the present time is the thorough removal of deposits and necrotic tissues, followed by frequent polishing of the roots and necks of the teeth, along with the most approved prophylactic treatment. My experience has been that medication has worked along splendidly with instrumentation; it also furnishes additional interest for the patients by giving them more to do, and certainly assists in healing the gums.

A mechanical stopping to prevent reinfection of deep pockets has been of great value to me. I cannot appreciate the value of a two weeks' delay after surgical work is done. It seems to me that the patient would possibly lose some of the interest that had been aroused, and the operator would be misled by the false closing of certain pockets in remote places; however, this might be minimized in the practice of a specialist.

I had the pleasure of spending a day in Dr. Hines' office recently, when he showed me a number of cases that were under his treatment, each showing remarkable progress toward health. I believe Dr. Hines is doing a great work, and I want to again commend this splendid paper, and feel proud of the fact that the essayist is a Mississippian.

Classification of Tissue Conditions in the Mouth as Related to Efficient Dentures.

By SAMUEL G. SUPPLEE, New York, N. Y.

(Read before the annual meeting of the New Jersey State Dental Society, Atlantic City, July 17–19, 1918.)

LET us study together for a short time the tissue conditions as we find them in edentulous cases, with the thought in mind that these conditions can be applied to partial cases as well. We do not propose to talk only of the rare and difficult mouths, but to recognize the ordinary ones as well. An intimate knowledge of the conditions of the tissues of a mouth of which we are about to take an impression for an artificial denture will enable us to select an impression material; also to determine the amount of relief of the casts, the length of the plate, whether or not the tissues should be displaced or compressed; also to determine the strength of the muscular attachments, and the rigidity or plasticity of the mouths, all of which conditions have to do with an efficient denture.

By an "efficient denture" I mean one which retains its place in the mouth firmly and comfortably during all the ordinary acts, such as speaking and yawning, as well as mastication.

There are four fundamental principles which must be recognized and followed closely, for in so far as we depart from 100 per cent. accuracy in the application of any of these principles we lose just so much in the efficiency of the denture. These fundamental principles are the impression, the occlusal plane, the relief of the cast, and the articulation or interdigitation of the teeth. We might add another, "the area to be covered by the denture," or, as Dr. Wilson has termed it, the "extension for retention," which should be considered while the tissue condition is under observation. This latter we shall refer to later.

While the form of the vault and ridges and the condition of the saliva may have some bearing on the final results, they are of minor importance as compared to the condition of the tissues.

Let us now consider some of the tissue conditions, that we may take up the first of the principles mentioned, viz, the impression.

I shall assume that you are acquainted with the other three, viz, occlusal plane, relief, and articulation, but we may have occasion to touch on them in the illustrations. We find we can divide the typical cases into four classes. (Fig. 1.)

THE FOUR CLASSES OF CASES.

In class I the vault and ridges are coated with an even layer of mucous membrane and connective tissue, and with muscular attachments rather high. Under these conditions the impression may be taken with any of the materials, such as plaster of Paris, modeling compound, etc.; in fact, by any of the methods that have been exploited in the last few years. In other words, the mouth will adapt itself to the plate.

In class II, commonly known as the "hard tissue mouth," we find the mucous membrane and tissue tightly drawn over the roof of the mouth and ridges, with the muscular attachments markedly strong and connected near the crest of the ridge with a hard bony prominence

along the median line. In such cases, plaster of Paris, or compound impressions with the mouth open, may be used with varying degrees of success.

Class III, commonly known as the "soft mouth," is one of the most difficult conditions we find, in that we have to discriminate between resilient and flabby tissue. The vault and ridges in this class are well covered with a thick coating of mucous membrane and connective tissue, with hard spots in different parts of the vault. The tissue may be either resilient or flabby. The muscular attachments are often very close to the crest of the ridge, and the whole outer half of the crest of the ridge seems to be movable. The technique, whether we need compression or perfect adaptation, will depend upon the tissue—whether it is resilient or flabby. The flabby tissue needs to be compressed. If the tissue is resilient, compression is contra-indicated. We find that the modeling compound impressions with the mouth closed, equalizing the bearing on the hard and soft tissues, are best adapted for this class of work.

In class IV we find the ridge in front, or some portion of it, to a greater or less extent soft and flabby. In extreme cases it is movable, almost like a second lip. Tuberosities may be either soft or hard, usually a hard area in the median line. The muscular attachments may be high or low. In this type of mouth we have to deal principally with proper displacement of tissue, including the ridges and tuberosities. We believe that, for this class of case, compound is the only material with which to take an impression to secure an efficient denture.

OBJECTS OF THE CLASSIFICATION.

The objects of this classification may be considered under three different headings:

First, to emphasize the importance of diagnosing the tissue condition and making a thorough examination of the mouth before advising the kind of denture to be made (whether metal or rubber).

Second, to indicate the material and technique to be employed in taking an impression.

Third, to have a simple but complete medium by which we can convey to the patient the importance of advanced fees for certain types of cases, and why it is necessary for us to charge Mrs. Smith one price and Mrs. Brown another, for what on the surface may appear to be similar cases.

In this latter respect, I have found that many dentists are unable to give a logical reason, when contracting, and are charging advanced fees on the strength of the kind of teeth used, different colors of rubber, etc., whereas time, technique, and ability should be the fundamental factors.

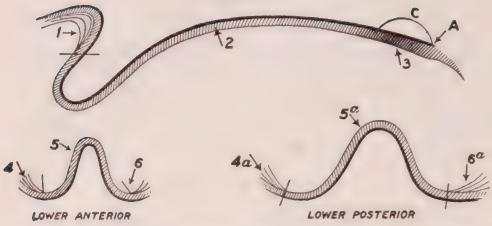
It may be necessary to charge Mrs. Brown twenty-five dollars for the first plate, and then find the tissue conditions change materially within from two to five years, so that the fee for the second denture should be double that of the first. Many dentists have been placed in the embarrassing position of having made a very successful denture for a patient, by using the old-fashioned plaster technique, and after five years having the same patient return with all confidence to have another denture made. The dentist proceeds to use the same material and technique, only to meet with one failure after another, until the patient has lost considerable of the original confidence, and the dentist has begun to believe in mysteries, or that the patient is expecting too much of him. A careful study of the histories of changes in the tissue conditions will clear up these mysteries, and prove beyond a doubt that rubber dentures and improper articulation or occlusion may be the cause of all the difficulties.

The effect of rubber, in contact with tissue, will cause tissue changes in classes I and II cases sufficient to cause them to pass into class III within from two to five years. Improper articulation and a rubber denture will cause either classes I, II, or III to pass into class IV within a period of from five to ten years, and in many cases less.

To reverse the conditions, we find that by making a gold plate, properly articu-

FIG. 1.

CLASS I.



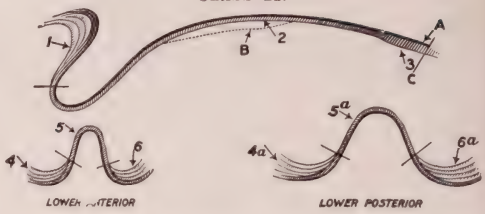
UPPERS.—1. Muscular attachments connected high on the buccal and labial surface of firm ridges. 2. Vault covered with uniform layer of membrane. 3. Slight soft areas in rear third of vault on either side of median line. a. Indicates end of hard palate.

LOWERS.—4-6. Muscular attachments connected low on the labial and lingual border of the ridge. 5. Uniform layer of membrane over a prominent ridge. 4a-5a-6a. Indicate same conditions in the molar region.

Satisfactory dentures can be made from plaster or compound impressions in any form, whether mouth is open or closed. The length of the denture antero-posteriorly can be anywhere within ¼in. of the edge of the hard palate, indicated by C.

(Technique No. 1.)

CLASS II.



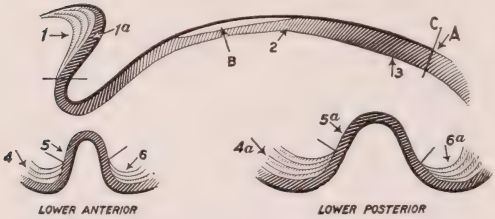
UPPERS.—1. Muscular attachments connected near the crest of firm ridges. 2. Vault covered with thin tensely drawn membrane. 3. Small areas of soft tissue in rear third of the vault, on either side of the median line. a. Indicates the end of hard palate. b. Bony prominence often present in the median line.

LOWERS.—4-6. Labial and lingual attachments connected near the crest of ridges. 4a-6a. Same condition in molar region. 5-5a. Firm ridge covered with thin tensely drawn membrane.

Mouths in class II require a small tray with mouth open or closed, using either compound or a combination of compound and plaster. Muscle trimming is an important factor. The denture must extend to the edge of hard palate, or as indicated by C.

(Technique No. 2.)

CLASS III.



UPPERS.—1. Muscular attachments connected to the ridge through areas of soft tissue, 1a, covering the buccal and labial surface. 2. Soft tissue overlying the vault, varying in density. 3. Pronounced soft areas in the rear third of the vault, sufficiently yielding to be affected by muscles of the soft palate. b. A small bony prominence in the median line that is often covered with soft membrane and cannot be detected without pressure.

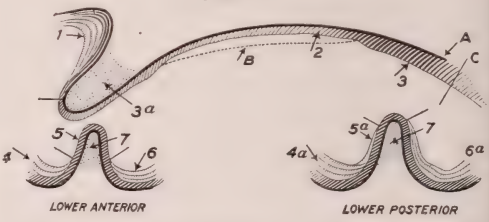
LOWERS.—4-6. Buccal and lingual attachments connected to the ridge through areas of movable soft tissue, 5-5a. 4a-6a. Same condition in molar region.

The best results can only be secured through the use of compound and "mouth closed" methods, equalizing the bearing on the hard and soft tissue when under biting pressure.

The edge of the denture at C must be just short of the vibrating (or movable) soft palate.

(Technique No. 2.)

CLASS IV.



UPPERS.—The predominant characteristics of class IV is soft ridge in front (3a), flexible tuberosities, or both. 1. Labial attachments may be either high or low, but connected to the soft ridge. 2. Soft tissue under the membrane may be thin, heavy, or varying in density. 3. Movable soft areas in rear third of vault may be small and shallow or large and deep. b. A bony prominence in the median line is often evident.

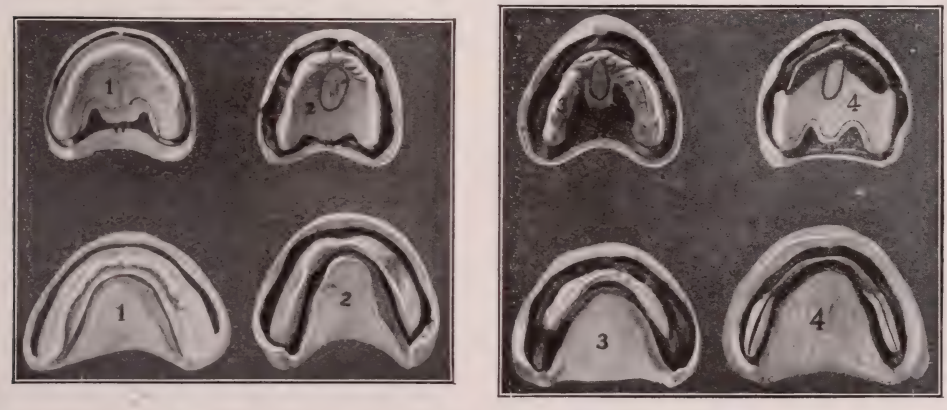
LOWERS.—4-6. Buccal and lingual attachments connected to ridge, 7, through soft membrane, 5. 4a-6a. Same condition in molar region. The soft ridge, 7-7a, is often thin (ribbon-like) and very flexible.

The use of compound to properly displace the ridges and tuberosities, the extension of the palatal border, and the equalization of bearing on the hard and soft tissues under biting strain are the essential points in class IV. The denture must extend beyond the hard palate, and embed sufficiently deep into the soft tissue at C to compensate for the droop of the edge of the denture when incising.

(Technique No. 3.)

lated, for a patient in class III (which is a difficult case) it will pass back into class I (which is a normal condition) within a period of less than a year. We also find that by making a gold plate for a class I case, within one year after extracting, and articulating the teeth according to scientific methods, the tissue conditions will remain the same almost indefinitely, except in patients of advanced years.

Fig. 2.



The dark area in the buccal and labial border indicates the muscular attachments as well as the movable soft area. The black areas in the vault indicate soft tissue. The blacker the area, the softer and deeper the membrane. (1, 2, 3, 4 represent classes I, II, III, IV.)

In many instances, the anterior ridge in class IV lower is the only part that is soft. However, there are frequent cases in which the ridges in the region of the bicuspids and molars are thin (ribbon-like) and very flexible, whereas the rest of the tissue may be comparatively firm. This type of case must be considered as class IV, and the impression material should flow from both the buccal and lingual sides toward the crest of the ridge, which is the underlying principle for this class of case.

Mouths that have become abnormal due to migration of teeth constitute one of our most difficult problems, particularly in upper jaws, where the vault and ridges are covered with thin, tensely drawn membrane similar to class II cases, and the prominence of the gum indicates that the teeth must be abutted to the gum. This means that we reduce the area of contact and lose the advantage of having the periphery or rim of the plate embedded into the soft tissue of the buccal and labial border. In this type of case we must eliminate all compression and displacement of tissue; even an impression with the mouth closed or open will make little or no difference, except in the region of the rear third of the vault.

OPERATION FOR REMOVING A PORTION OF THE PROCESS.

Dr. Ruyl of New York has suggested, and in fact is producing some very remarkable results by, the removal of the outer plate of process over the buccal and labial borders, by means of a simple operation, after which the most artistic results can be secured with pink rubber fronts, without showing any of the rubber.

Dr. Ruyl's method of procedure in these cases is to perform the operation when removing the teeth. If the teeth have been removed previously, he makes an incision along the ridge adjacent to the area where the bone is to be removed, denudes the process to a point below the line required for cutting off the process, and then cuts off the necessary bone with the bone-forceps. The edge of the process is rounded off with

an engine stone, and the gum flaps pressed back with the finger and thumb. These are cut off with gum scissors until they fail to meet *by about one-sixteenth of an inch.* Healing is allowed to take place, and in about four weeks an impression can be taken for any plate.

This operation usually reduces the height of the ridge, and the buccal and labial attachments will be decidedly movable and connected close to the crest of the ridge. This indicates that the case will fall under class II or III, depending on the condition of the tissues overlying the vault, but in any event much care and attention must be given to muscle trimming in taking the impression.

In some cases of the class IV type where plates have been worn by patients masticating on the front teeth only, excessive resorption takes place in that region; and the process in the bicuspid and molar regions indicates an enlargement or failure to resorb.

It would be impossible to put in a full denture and allow the cutting surfaces of the artificial teeth to follow the line of the occlusal plane. In order to establish a normal occlusal plane it would be necessary first to remove the hypertrophied gum and process in the molar region to a line where it would be possible to follow out the proper plane.

Then again, many times in the lower jaw the protrusion of the lower teeth is so great that it pushes out the process, making a protrusion of the lip and giving the appearance of a protruded lower jaw. Where an upper plate is required for such a mouth, it would be impossible to bring the teeth of an upper denture outside of the lowers, and the only way that an upper denture could be worn would be by allowing the upper teeth to strike inside the lower, thereby increasing the abnormal protrusion.

Cases of this kind must be treated surgically, and the mouth restored to normal, so that we can establish a correct occlusal plane, which, in addition to the proper impression technique, is necessary to the construction of the most efficient denture.

Inasmuch as this paper is intended to bear especially on the classification of tissue conditions as related to efficient dentures, the impression material must be considered only in a relative manner.

IMPRESSION MATERIALS.

It must be recognized that plaster can be used successfully in classes I and II. The technique being somewhat simple, plaster is popular with the dentist for general use, regardless of the undesirability from the patient's standpoint, with the result that its failures are legion when used for making dentures for patients with tissue conditions as indicated in classes III and IV.

It has been the experience of the speaker that the great majority of the troublesome cases fall under classes III and IV, as will be shown later; and if the dentist will spend the time necessary to become so familiar with the manipulation of compound that he can solve the difficult ones, he will find that he can take short cuts in the compound technique that will save time, be pleasanter to the patient, and insure a greater degree of success than by any one of the modern plaster techniques.

Those who have not the time or the inclination to study compound may find it well to familiarize themselves with this classification, and use the simpler plaster or compound techniques for making dentures for classes I and II, and to refer their patients having class III or IV tissue conditions to those who specialize in prosthodontia.

With these thoughts in mind, let the illustrations be studied, as they show the benefit of this classification in making plate work more artistic and more profitable from the standpoint of the dentist, and more efficient from the standpoint of the patient.

CONCLUSION.

The very best results from plaster impressions are limited by the existing tissue conditions, while the value of compound is limited only by the ability of the operator in applying the proper technique to the class of case in hand.

1 Union Sq.

The Influence of the War on Dentistry and Dental Colleges.

By S. W. FOSTER, D.D.S., Atlanta, Ga.

(Read before the annual meeting of the Mississippi State Dental Association, Meridian, April 16 and 17, 1918.)

Mr. President, and Gentlemen of the Mississippi Dental Association:

I HAVE been requested by your Executive Committee to speak of the influence of the war on dentistry and dental colleges. We all appreciate the fact that the great war in the throes of which we now are, and into whose vortex the great nations of the earth have been drawn, through the lustful ambition of an unscrupulous, selfish, and designing German monarchy for world dominion, has been the most brutal, mutilating, and destructive that the world has ever seen. Particularly is this true as it applies to the mutilation of the human face, that portion of the body with which the dental profession must deal.

It has been the means of putting the dental profession through a crucial test to which it has not previously been subjected. Dentistry has been given an opportunity to demonstrate its usefulness to humanity, and take its merited position among the learned and scientific professions, as never before during its history. The question naturally presents itself, Is the profession "making good"?

Realizing that there was a humanitarian call to duty early in the conflict, when the noble, courageous, though virtually helpless country of Belgium had been crushed, when every resemblance of honor and chastity had been ruthlessly cast aside, and the iron hand of German brutality was attempting to throttle all nations, and womanhood on every side was being outraged, noble men of our profession answered "Ready!" And the work they have accomplished and are still carrying forward will not only, I predict, go down in history as among the greatest in the relief of suffering and restoring the human form, but as generations pass down the endless cycle of time their names will be written in the firmament in letters of gold, and stand out with the brightest luminaries, pointing those who may follow to still higher attainments.

When the war burst upon Europe in 1914, the position of the dental surgeon in our army was that of contract dentist. Today Congress has honored him with rank and emoluments equal to those of the medical profession. This recognition, which the dental profession has sought for in vain in the years past, has been given by reason of the splendid work done toward the relief of the injured.

The law provides for one dentist to every 1000 enlisted men, but the services of the profession as viewed from the standpoint of the army are of such importance that it has been recommended that the quota be increased to one to every 500 men. Nor has the Administration stopped there; they have recently organized a school for dentists in Oral Plastic Surgery, located at Camp Greenleaf, Chickamauga Park, Ga., this being the first school of the kind ever so organized. Having awakened to the importance of dental service from the standpoints of infection and prophylaxis, surgery, and prosthesis, our Government is

using every effort to increase the efficiency of those they depend on for such service. I am informed that it is the purpose of the Government to specially train at least 1000 dental surgeons in this school during the next twelve months.

What of the dental colleges? As a matter of fact, the dental colleges of the United States are virtually under the control of the army and the Government. The Medical Corps secured the passage of a bill, last October, permitting dental students who were drafted into military service to return to college and complete their dental courses before continuing active service. This was a special privilege granted because of the importance of the service for which they are qualifying. These men are enlisted in the Medical Reserve corps in inactive service. The freshmen just entering college are also permitted to enjoy the same privilege. The Government demands of the colleges special reports as to the standing and progress of such students. The War department requires an inventory of college equipment and general teaching faculties, and insists on a higher standard of qualification than has previously existed as a whole. They also reserve the right to deny recognition to a college and to transfer students from one school to another when in their judgment it would be to the advantage of the students.

Colleges which are progressive are today teaching oral surgery, treatment of infectious wounds, splints, wiring, bacteriology, sterilization, pathology, and physical diagnosis, to say nothing of anatomy, physiology, and chemistry, in a more general and comprehensive manner than in years past.

The college course has been increased to four years. The effect of this lengthening of the course has been to reduce the attendance in our colleges, but we feel sure that the higher quality will more than compensate for the lack of attendance.

Now, gentlemen, we can readily see from the foregoing that from this the most terrible of all wars has resulted the greatest recognition of dentistry, and let us not forget that with this recognition come greater responsibilities.

We have been put on an equal status with the medical profession. This being true, we are expected to come up to the standard set by those with whom we are given equal rank. And, gentlemen, from the reports I have from Washington, it becomes necessary for the dentists of this country to take stock and strive to improve and merit this high standing, or we as a profession may fall more or less into disrepute. The bringing together of the dental and medical professions is going to prove one of the greatest benefits of the war, as well as increasing for us the respect of all.

Probably nothing has been of such benefit to both the medical and dental surgeons as the observations made in the prevention and treatment of traumatic infectious wounds. It has been learned that the interval of time elapsing between the injury and the operation, and the thoroughness of the removal of foreign bodies and dead tissue, are vital factors in the problem of infections of military wounds. We now know as we did not before that virulence of infection in traumatic wounds increases with the delay of surgical treatment. Traumatic infection of tissue is first confined to the exposed surface of the wound; and if a patient can be promptly treated, say within three to four hours after injury, it is possible to remove mechanically all sources of infection from the surface of the wound.

Our surgeons, both oral and general, have demonstrated as important factors in prevention of infection—1st, prompt surgical treatment; 2d, removal of foreign bodies; 3d, complete removal of devitalized tissue; 4th, the application of a germicide that will not delay the closure of the wound, and 5th, immediate closure of the wound when infection has been avoided.

However, it is not always possible to prevent infection. Splendid progress has been made with germicides. It is the consensus of opinion that the chlorin preparations have proved the most ef-

fective germicides. However, the standard preparations, such as Labarraque's and similar solutions, are found to be irritating to the skin. To overcome this condition, one of the most satisfactory preparations brought out was a dilute modification of Labarraque's solution known as the Dakin-Carrel solution, but it is so unstable that it is necessary to keep it almost constantly applied. The active chlorin is liberated very rapidly when applied to wounds.

Recently there has been produced a synthetic preparation by Dakin which he calls "Dichloramin-T" (toluene para-sulfon-dichloramin). This preparation is in the form of a powder, and an oil is used as the menstruum for dissolving it. Eucalyptus was first recommended, but now chlorcosane (liquid paraffin chlorinated) is principally used. This will hold 10 per cent. of dichloramin-T in solution, but the usual strength recommended is that of from 2 to 5 per cent.; it must be kept in green bottles and in a cool place. It can be procured through Parke, Davis & Co. I mention this simply as an example of the progress which is being made in aseptic surgery.

As a result of the war, dentistry has been invited to occupy a position now in advance of what it could hardly have attained in twenty-five years. And, gentlemen, it is up to the dental profession to make good. Will we do it?

100 N. Butler st.

The Relation of Nasal and Oral Sepsis to Systemic Disease and Surgical Conditions Resulting from Focal Infections.

By J. M. GUTHRIE, M.D., Meridian, Miss.

(Read before the annual meeting of the Mississippi State Dental Association, Meridian, April 16 and 17, 1918.)

AFTER reviewing the opinions and findings of others, I have come to the conclusion that the diagnosis of focal infection is often not a simple or easy matter, but in all systemic infections of obscure origin the nose, mouth, and throat should be carefully examined. The aid of the dentist and rhinologist will often have to be sought, and a skiagram of the face and head may be required to locate the origin of the evil.

The treatment that offers the greatest measure of relief from nasal and oral sepsis is necessarily prophylactic. The physician must ever look on a "blind" oral abscess as he would on an appendix that is infected, a mastoid that is full of pus, or a tonsil that is septic, and its removal should be effected, whatever may be the dental cost.

The problem with the dentist is not only to decide when he can save his patient from losing a tooth, but he must grasp the larger and more important consideration that losing a tooth may save his patient from a serious or possibly fatal infection.

A grasp of oral pathology and health conservation will be a greater asset to the dentist of the future than the mechanical skill that will produce a faultless inlay or preserve a devitalized tooth.

Billings declared that carious teeth are an inexcusable evidence of faulty

personal cleanliness in those who are otherwise healthy.

The rôle of diseased teeth in the causation of antrum trouble has long been generally recognized, but there are some other pathologic possibilities in abnormal teeth which have not received the recognition by the general profession that their importance would seem to merit:

Brandt has called attention to the rôle of diseased pulps in the production of suppurative inflammation in the nasal cavities.

Kallibay has stressed the part played by aberrant teeth and dentigerous cysts in the production of neuralgia in and about the nasal area.

Weeks has recently revived the question of causal relationship between nasal obstruction and dental malocclusion.

Pollock has reviewed the literature of suppurative perichondritis of the nasal septum resulting from alveolar periosteitic abscess of the incisors, finding eight cases, together with one of his own. He likewise found in the literature 106 cases of arthritis resulting from diseased incisors.

Baldwin has called attention to the rôle played by erupting teeth in the production of tonsillitis and earache.

Allport mentions myringitis, deafness, furuncles, and eczema as frequently resulting from dental disorders, and he urges the careful examination of the teeth in all cases of aural discomfort.

Bennett reports a case of obstinate deafness in a middle-aged woman from unknown cause relieved by extraction of roots of the second and third molars.

Scarisbrick directs attention to the frequent association of enlarged tonsils with carious teeth in school children. He reports examination of some 4000 children, and concludes that enlarged tonsils are found with greater frequency in those having dental caries than those with perfect teeth. The incidence of enlarged tonsils is greater among children having many bad teeth than in cases with only two or three carious teeth. Marked enlargement of the tonsils is much more frequent even than moderate tonsillar enlargement among children with caries, as opposed to children having perfect teeth.

Surgical conditions which result from a focal infection are often much more evident than the focus from which the infection arose. It is only recently that the importance of such foci of infection has been recognized and their treatment changed. Formerly, the lesion resulting from the infection was treated; at present, treatment consists, first, in searching out these foci and removing or draining them. The foci are often insignificant and difficult to find, especially when the symptoms produced by the extension of the infection are most marked.

MOST FREQUENT SEATS OF FOCAL INFECTION.

The foci considered the most probable source of infection which become surgical are, in their relative importance, as follows:

(1) The tonsil. The organisms may be lodged in the tissues of the tonsils, or there may be a small abscess between the lymphoid tissue of these situations which may easily gain access to the blood or the lymph stream.

(2) Alveolar abscess. This focus is often overlooked because it is very small. Oftentimes it requires an especially good roentgen-ray plate to make it manifest. It is difficult to realize that a small abscess at the root of a tooth may be the cause of systemic infection which may become very serious, though there are many cases on record in which such a condition has been completely relieved by the drainage of this sort of abscess.

(3) Infection in the integument, especially in the form of a boil or a carbuncle. When the systemic infection follows a boil or a carbuncle, the symptoms of the general infection usually develop about the time that the local condition has subsided, so that treatment in these cases consists in removing the distant infection.

(4) Several other regions—principal among which are the nasal sinuses, the ethmoid cells, and also the seminal vesicles. Many cases of gonorrheal rheu-

matism have apparently been cured by the drainage of the latter.

Infection in the lymph nodes in the cervical region is very common. In children the glands become swollen and tender, and sometimes suppurate. This condition is associated with enlarged and infected tonsils or infected adenoid tissue and teeth. Clearing the throat of these infections is almost immediately followed by the subsidence of the infection in the cervical lymph glands. Formerly scrofula was treated by opening and draining, and sometimes by removing these glands. This, however, will not be necessary if the infection in the throat is cleared up. But if the infection in the lymph glands does not subside after the throat has been freed of the infection it will be necessary to remove them, or they will become the foci of more extensive infection. Tuberculosis of the cervical lymphatics is not as common as it was at one time.

It is very interesting to observe the frequency of inflammation in the tonsils in patients suffering from exophthalmic goiter. The inflammation is often severe, and I have seen a number of cases go on to suppuration and quinsy. Many patients with exophthalmic goiter say that they have had repeated attacks of suppurative tonsillitis. Removal of the infected tonsils is important in the treatment of these patients, but we have not observed cases in which the symptoms of goiter were cured by removing the tonsils.

Surgical conditions in the chest which result from focal infections may be designated as pleurisies, empyemas, and lung abscesses. These conditions more frequently follow pneumonia, which in itself is often the result of a focal infection.

In conclusion let me say, in the light of what is now known, that no physician can justify his action, or rather inaction, who, making a diagnosis of idiopathic arthritis, neuritis, or endocarditis, ceases further to investigate, and rests secure in blissful ignorance. Idiopathy is only a synonym of ignorance, and no physician can afford to seek a refuge beneath its crumbling walls.

A FEW REASONS FOR TRYING TO LIVE LONG ENOUGH TO KNOW YOUR GREAT-GRANDCHILDREN.

We of this generation consider ourselves pretty broadminded, but our great-grandchildren will think of us as narrow, unimaginative mossbacks. They will have the same sort of opinion of our outlook that we have of our great-grandfathers'.

Professor Loeb and other scientists already have taken important steps toward the discovery of the secret of life, but we cannot comprehend even now that in the time of our great-grandchildren doctors may know how to create life and keep the human machinery going after it has run down.

Neither would our great-grandparents have believed that by now physicians and dentists would cure "rheumatics" by treating the teeth or removing the tonsils, that they would transplant nerves, bones, and bloodvessels, make new jaws for wounded soldiers, and conquer the terrible and fatal "inflammation of the bowels" by removing the appendix.

It may seem far-fetched to us, but it should be perfectly true that, by the year 2000, disease will have been banished from the earth. Such a boon is no more impossible than was the idea, a hundred years ago, that by now we would have driven smallpox, yellow fever, bubonic plague, and typhoid from intelligent communities, and that the medical men of our time would find means to prevent lockjaw and blood poisoning.

Impossibilities have become accepted realities with such amazing regularity since our great-grandfathers' time that he is a brave man who would dare to predict that anything in human desire would be impossible by our great-grandchildren's day. The best we can say is that we are living in the most wonderful period of history so far. We cannot live to see the next century, but we can determine to live just as long in this one as possible.

Any excess or dissipation or carelessness which tends to shorten our life cuts off that much of our opportunity to see the wonders of the future. There never was such a poor time to die; never such a fine time to live. Each day that you add to your life by careful living may mean that you see another miracle. Think of it in that way, and the simple rules which make for health and longevity will become golden commandments.

"Exodontia."

By B. A. BATSON, D.D.S., New Hebron, Miss.

(Read before the annual meeting of the Mississippi State Dental Association, Meridian, April 16 and 17, 1918.)

UNDOUBTEDLY, exodontia is one of the oldest branches of dental procedure, if not *the* oldest. The history of our profession in every civilized country shows that the necessity for the extraction of teeth has been recognized from time immemorial.

A perusal of the history of this branch of practice, however, shows that but little advance in technique was made until comparatively recent times.

Among the English-speaking races, this feature of practice was given an impetus by the invention of the anatomical forceps by Sir John Tomes in the year 1840. Promiscuous "tooth-pulling" followed this invention. So prevalent, indeed, did this practice become that even within the remembrance of some of our older practitioners, the barber and the blacksmith in many localities were called upon to perform these operations. So short a period has elapsed since this evolution began that it is not unbelievable that such pseudo-operators exist even today in districts remote from dental influences.

The inevitable result of such unregulated practice has been in the past the unnecessary loss of many dental organs which, if given proper conservative treatment, would have again become useful members of the masticatory economy.

The rapid developments in the art of prosthesis during the latter half of the past century were due in large measure to this indiscriminate tooth sacrifice. So prevalent was this mode of treatment for diseased teeth that inevitably, with the mass of the people, dentistry and "tooth-pulling" became synonymous terms, and dentist and tooth-puller became closely related individuals.

The influence of this propaganda is felt today even in our cities, and, as many of these procedures were carried on without the beneficent aid of an anesthetic, much of the present-day inherent dread of the dental chair may be attributed to these influences. It is probably true at the present time in many localities that some unnecessary pain and inconvenience is inflicted on patients.

The thoughtful minds in our profession today realize that the extraction of teeth is a surgical procedure pure and simple, and that it should be carried out on surgical lines, that surrounding sanitary conditions must be maintained, that sepsis must be avoided, that no pain should be inflicted, and that the early abuses incident to this operation must be corrected.

The spirit of the newer dentistry has developed specialists for these operations, and in dentistry, as in any other art, new discoveries and inventions demand

new terms and a development of language to measure up to these new conditions. Our nomenclature, therefore, has expanded, and where we formerly heard such bungling terms as "specialist in extraction," "I confine myself to the extraction of teeth," "I extract teeth only," "extraction specialist," "I do extraction," etc., the modern definition of this field is "exodontia," and the operator who devotes his efforts entirely to this specialty is termed an exodontist.

While these appellations are new, they are scientific in derivation and will live because of their correctness and because they lend a dignity to this field which before was lacking. It is equally true that what dignifies any one component part of our work adds to the dignity of the whole.

We are brought, then, to the exodontia of today, and a few words are apropos as to its practice and its bearing on the dentistry of tomorrow.

Being convinced of the general misunderstanding of the aims of dentistry on the part of the laity, and of the influence the extraction of teeth in the past has had in causing this misunderstanding, together with the realization that the apprehension of the dentist is due to operations in this field more than in any other, it behooves us all, whose future welfare hangs on the thread of public confidence, to aid in the correction of past abuses and to rectify former mistakes as we are competent to do so. In short, to quote Dr. Winter, "The sooner we become exodontists and practice exodontia, whether as a specialty or in general practice, the sooner will this condition be improved." The public is demanding more scientific service in this field, and organized dentistry must provide that service.

What, then, constitutes exodontia? is a logical conjecture. If we assume, as does the average layman, that every tooth is merely a tooth, and that an extraction is but the "pulling" of a tooth, we miss the mark, as does he. Exodontia, as we understand it, properly executed, means a successful surgical operation—an operation more dreaded by the majority of people than any other, and one performed far more frequently than any other.

Among the elements making for success in exodontia, the first contingent must be an adequate anesthesia and absolute freedom from pain. Modern surgery demands this for two reasons: First, to facilitate operating; and second, to obviate shock. The latter consideration is by far the most important. Shock, as defined by DeFord, is a depression of the medullary centers controlling circulation and respiration, caused by too painful, too prolonged, too sudden, or too forceful stimulation of the afferent fibers, and is always accompanied by a lowered blood pressure.

ANESTHESIA IN EXODONTIA.

Accepting this definition, does not the vivid picture of outrages to sensitive nervous systems at the dental chair come to our minds?

The "tooth-puller" did not consider these sequelæ at all. Exodontia demands that, through its agency, shock, either psychic or physical, shall not occur if it is possible to obviate it. The choice of the anesthetic to be used must depend on the individual requirements of the case, the physical condition of the patient, the length of the operation, the accessibility of the field, the co-operation of the patient, and the operator's knowledge of his agent.

The accepted anesthetics *par excellence* today are nitrous oxid and oxygen and novocain. Individual requirements influence our choice. Somnoform is dangerous on account of its ethyl chlorid content, though useful in certain cases, while ether as a sequence to nitrous oxid and oxygen in hospital procedure for protracted operations is often indicated.

The general practitioner naturally has more use for a local anesthetic, and in this field novocain with suprarenin synthetic has rendered cocain practically obsolete. For the exodontist, conduction injections are rendering certain types of operations easy where formerly nitrous oxid and oxygen in the dental chair

militated against successful results. For routine work, however, nitrous oxid and oxygen is superior to all other known agents.

The modern exodontist realizes, too, that the removal of a tooth from its supporting structure alone does not constitute a successful operation in cases of sepsis. The thorough curettage of a chronically infected socket, which is now known to be so essential, is but a part of the exodontist's routine.

The preparation of the field of operation, the complete sterilization, the performance of the work under aseptic conditions as far as mouth conditions will permit, the dressing of the tooth sockets, and the attention to the physical condition of the patient—all are necessary details for the successful issue.

Before the advent of exodontia in its broadest sense, it is probable that tooth extraction was performed in a more haphazard manner than any other phase of our work. Methods of operating were the same as those of a decade previous. Even today probably more failures occur in the extraction of teeth than in any other operation undertaken by the average dentist.

Constructive dentistry has reached such a perfected stage that if any restoration is undertaken, it is known beforehand almost to a certainty what the outcome will be. Does the average dentist so regard the prognosis of his proposed difficult extraction?

There are many reasons why the outcome of an operation of this nature should be as certain as any other dental or surgical procedure. The causes of failure in any operation are usually attributable either to the difficulty of the work undertaken or the lack of skill on the part of the operator. In exodontia the former cause is due ofttimes to an incomplete diagnosis, and the latter to a lack of knowledge of the anatomy of the parts involved, a disregard of the pathological involvements, and insufficient operative dexterity.

Lack of manipulative ability, however, can seldom be laid at the door of the dental profession, but in undertaking serious extractions the former considerations are perhaps at times overlooked. The large proportion of unsuccessful attempted extractions goes to prove that the difficulties are frequently underestimated. We must of necessity recognize the fact that the removal of teeth under certain conditions demands a degree of skill and a technique as perfect as in any other surgical operation.

A far greater degree of skill is demanded of us today than in the past. The teeth presented for extraction are usually in a broken-down state, few crowns are intact, impactions are frequent, fractured roots are common, and other abnormalities are present. Whereas fifty years ago at the first symptoms of trouble the tooth was removed while in a practically non-carious state, today the greater proportion are decayed almost beyond recognition and very frequently surrounded by pathologic disturbances. In spite of increasing difficulties to successful tooth removal, the public demand is for better service, and the demand is a just one. Unsuccessful operations react against the practitioner, even though he be not at fault. And not only is this true in the case of the individual, but this reaction also affects the profession at large.

We can closely estimate the number of patients lost to the dentist through unsuccessful extractions. And how many of these never again seek dental service of any kind unless driven by pain to do so? If the individual fails in a procedure as far-reaching in its advertisement, the whole profession must correspondingly suffer, for the effect of a failure is more far-reaching than is a successful result.

The query is often propounded, Should the general practitioner be a skilled exodontist? Our reply would be that he should be skilled in this as he is expected to be in any other operation which he undertakes. Whether in exodontia or any other phase of practice the question revolves around this other question, "Is the patient entitled to the best service obtainable?"

While I thoroughly believe in exodontia as a specialty, I also believe that the general practitioner should be skilled

in exodontia if he includes that class of operations in his practice. Many general dentists do not desire to extract teeth, many are called upon to do so even against their wishes; all dentists occasionally meet cases which could not be referred if they so desired. These demand attention, and even if simple cases, they deserve the best of care.

Probably in no line of his endeavor has a dentist such a rare opportunity to pave the way to a patient's confidence as in a skilful extraction performed under the right conditions.

During the future years exodontia will play a greater part than ever before in the oral hygiene propaganda. These two fields lie close to each other. No longer is it good practice to leave a diseased tooth in an otherwise clean mouth. Perfect mouth sanitation demands the removal of these infected foci. When the oral hygiene movement shall have reaped its deserved reward it will be found that modern exodontia has played an important rôle.

In conclusion, we believe that the scientific extraction of teeth is but in its infancy, and the future years will unfold much for the betterment of the race, but in the meantime it behooves us all to practice exodontia, and not "tooth-pulling"; and let us, whether specialists or general practitioners, live up to the best teachings of our period. Then we shall each do our part toward making exodontia a worthy part of the great fabric of dentistry which is destined to do so much toward the alleviation of human ills.

The Arrival of the Dentist.

AMERICAN RED CROSS.

American Red Cross workers are so popular in the neighborhood of this hospital for refugees near Lyons that the repatriate children even welcome the arrival of the dentist with his instruments. However, by means of pictures, magic lanterns, movies, charts, and exhibits, these little folks have learned the importance to France of keeping their teeth in good condition, and like their fathers, are ready to serve France even if it does hurt.

PROCEEDINGS OF SOCIETIES.

Dental Society of the State of New York.

Fiftieth Annual Meeting, held at Saratoga Springs, N. Y., June 13-15, 1918.

(Continued from page 927.)

THURSDAY—*Evening Session.*

The meeting was called to order at 8.30 o'clock, by the president, Dr. Rich.

CHARLES H. MAYO, M.D., of Rochester, Minn., was expected to be present in person to read his paper entitled "The Control of Focal Infections," but sent a telegram stating that military duties prevented his attendance. His paper was read by Dr. A. L. Swift, of New York City.

[This paper is printed in full at page 963 of the present issue of the DENTAL COSMOS.]

DISCUSSION.

Dr. M. L. Rhein, New York City. The size of the audience present to listen to Dr. Mayo's paper is the strongest evidence of the impression that has been made upon dentistry in the past few years by this subject. Surely all of us here tonight realize the impossibility of any audience of this size being interested in this subject a decade ago.

What I have to say on this subject is purely of an impromptu nature, and I trust you will accept it in that way. In considering the subject of focal infection, there are two methods by which the toxins from these infections are carried into the system, *i.e.* either by continuity and absorption, or, as Dr. Mayo has said, carried to a distant part through the circulation—the blood, or the lymph, or the chyle, whichever it may be.

The question of the control of focal infections is unquestionably a very practical one, as far as it concerns dentistry. The question is, What are we, as dentists, to do under the circumstances? Dr. Mayo has divided the subject into two phases, one preventive and the other curative—a division that is undeniably the best that we could make. There is not a point in the splendid paper to which we have just listened that I can imagine exception being taken to. Of all the essayist has said, the most impressive thing to me was his reference to the subject of the prevention of focal infections. This is no new topic to dentists; it is almost as old as dentistry itself, and it is the one thing that we ought to give the greatest attention, in order that the coming generations shall be brought up in such a way that focal infections cannot take place, which means that there shall be no devitalized pulps—because, when you analyze the subject, it rests there.

I was particularly impressed by the division the essayist made when he spoke of abscesses. Personally, I prefer to divide this subject, in treating of its symptomatology, into abscesses and what we were formerly accustomed to calling "blind" abscesses. The essayist divides them into those in which the bacteria are loosely held, as against those that are under tension, and he speaks most forcibly of the greater danger of those in which the bacteria are under tension.

The ordinary alveolar abscess is one where we have suppuration, where the toxins are germinated from the pus, and are not under tension. Nature has already started in to play the rôle of doctor to cure the patient. The pus finds an outlet in the mouth, and is swallowed, and to a certain extent this action is nullified by the gastric juices. The alveolar abscess is comparatively harmless as compared with the "blind" abscess. Dr. Mayo has noticed this clinically, and it is entirely in accord with all we have noted in the literature on the subject. In the "blind" abscess we have no suppuration. We have the colonization of bacteria, locked in about the roots at the ends of the teeth, and during mastication and the movement of the teeth we get the tension he speaks of against this habitat where the bacteria do not proceed to cause suppuration, because no inflammation sets up under these conditions; but they in turn produce the same toxins that are produced by the alveolar abscess, only in this case there is no outlet for this poison. It remains securely locked in this comparatively small space, and the safety of the individual is dependent entirely upon how immune he or she may be against these poisons. Nature provides for the defense of the individual by the cell life that he speaks of, and it is only when these defensive conditions are weakened —it may be by disease, it may be by over-exercise, or it may be through some local cause; but when this defensive power is lessened, then is the time these toxins are taken up by the circulation and carried to some special point, and their manifestation becomes a more or less serious or perhaps a critical one.

The prevention of this condition is the one thing we, as a profession, should give greater consideration to than we have done in the past, because it is the only positive thing we know today that will assure the ultimate preservation of the natural teeth. That means starting with the teeth before the child is born—starting with the education of the mother in regard to the character of the food that makes for proper teeth in the child. From the time the first teeth are erupted there comes into play the question of focal infection, and that involves the broad question of what may be termed the prophylaxis of the mouth. With this subject we are all familiar, and it is the one great means that dentists must in the future utilize beyond what we are doing at the present time, if we would do our share, as far as our responsibility is concerned, toward the welfare of the teeth of the future race of our country.

In regard to the curative question—and that is the difficult one that confronts us as a profession—the point I would start with is that the dentist is not educated to handle these cases properly when they first present themselves. The dentist has not been instructed in making a proper, careful diagnosis of a mouth where a focal infection is suspected, or where one may exist. Too frequently, when there is just one tooth in question that stands out with a focal infection, the dentist goes right to work at that tooth, and pays very little attention to the rest of the mouth. There may be a dozen other focal infections in the same mouth; that is a point that should be well understood. What does a diagnosis mean? It means, first, that the dentist should have a chart of the mouth that indicates absolutely every tooth in which a devitalized pulp is present, or suspected to be present, and to demonstrate to himself whether such a condition exists; there is nothing of more importance than this.

The next step is to make a diagnosis of the conditions, the symptomatology; whether it is a case in which a pyorrheal condition is combined with a focal condition, or whether perchance there may be a pericemental infection without a devitalized pulp. To make this examination properly is a matter that cannot be done in a few minutes, and frequently not in a few days. It means the proper roentgenographing of the mouth. It means an understanding of the proper physical condition of the individual. A dentist who is handling a case of that kind should have at his command the urinalysis of such a patient, the blood

examination of such a patient, and the opinion of the internist, if there be one in the case. All of those questions become important matters in the decision that he must come to, after he understands properly what the condition of each particular tooth may be. If, for instance, we have a patient in whom the teeth to all intents and purposes, physically, as they express themselves to our view, present the very best of appearances—as I have frequently seen them, where before the use of the X-ray we would never have dreamed of a focal infection—and yet that individual is suffering from marked toxemia, a very marked diabetic condition is present, or a nephritis in a marked degree that has alarmed the internist. That is no case, in my opinion, for prolonged dental treatment—however successfully we may be able to save those teeth, if the condition of the patient were not so serious.

In many of those cases it is important to know what the physical condition is—not as we, as dentists, look at it, but as the physician looks upon it; and it is for that reason that focal conditions of infection should be handled only co-operatively by the physician and the dentist. Often when we know from a careful examination of the roentgenogram of an infected tooth that we have the ability to put that tooth in a healthy condition and to keep it free from infection, we should realize that before that can be properly accomplished we may endanger the life of the patient! Under such circumstances, I do not think there is an individual present who, if he fully realized that fact, would think of attempting to save such a tooth. In other words, the value of the tooth becomes insignificant—much as we dentists may value it—when we compare it with the life of the individual.

Granting that fact, we now come to another stage of the question of the control of focal infection. We have before us, we will assume, an individual in whom the blood examination, urinalysis, and everything else is of such a nature that the internist says, "If you can save those teeth, go ahead and save them." It is now up to the dentist to determine, "Can I put the tooth, or the teeth, in such condition that these focal points will be not only free from infection, but will remain free from infection?" I contend that it is only partially doing our work if we simply treat those teeth so as to eradicate the infection and not be secure in the belief that they cannot become reinfected. Today I believe that it is almost impossible for any man, after he has completed the eradication of focal infections and put the most valuable kind of work into the operation, and has made a root-filling that meets his satisfaction, to say immediately on the conclusion of the operation that that tooth is safe from infection. I do not believe he can give a safe opinion in regard to a tooth of that kind until from six to twelve months have elapsed. In other words, the only rational proof we have is that there shall be a regenerated alveolar structure where the bone was destroyed, and that it shall remain in that condition. If we fail to secure that result the operation is a failure. Today I do not believe in my own mind that a large number of teeth with devitalized pulps are fit to remain in the human jaw, although fifteen years ago I felt calmly secure in the belief that they could be placed in a healthy condition. I have reduced in my own mind the percentage of such teeth that are fit to remain in the mouth, and while I realize that this is an extremely discordant note to introduce to a body of dentists whose aim is the preservation of the human tooth for the value it has to humanity, yet I can only appeal to you, my brother dentists, in this way: That it is our duty to become big enough in the moral sense to outgrow the natural smallness of all specialists who see only the small field in which they are interested, but constantly to keep before our minds the thought that we, as physicians of the teeth, are just as certainly physicians of the body. We cannot isolate a part from the whole, and when we imperil life we are no credit to ourselves. I do not think there is a man or woman in dentistry who values a human tooth

more than I do, and I realize the wrongs I have done innocently in this respect; and it is for that reason I say we must be careful not to retain in the mouth teeth that are a menace, or are liable to be a menace, to the life of an individual.

The argument is frequently made that as long as the loss of the alveolar structure is not progressive, as long as we can watch such a tooth by means of the roentgenogram, we should keep those teeth, and keep them under observation. Let us stop for a moment and think what it means to keep the teeth of our patients under roentgenographic observation. Is that a practical matter with the majority of our patients, to say the least? You know it is not. Who knows where that patient may be when that immunity to this toxemia may break down? Only three weeks ago I extracted two molars from the mouth of a woman around the age of sixty years, in which I filled the roots about twenty-five years ago. They were teeth filled with nodular pulp matter in such a manner that I failed to reach the foramina of those teeth. I knew it at the time. I spent hours in the treatment of those teeth. I have radiographed those teeth in the past ten years a dozen times, and never found anything but healthy alveolar structure there until about three months ago, when the patient, presenting herself, as she did on regular occasions, for prophylactic treatment, sent word in to me that she thought she would like to have those teeth radiographed again. To my astonishment, I found marked focal infections at the ends of the roots of both those molars. Those teeth were extracted within forty-eight hours. There is a case where the patient of her own accord entirely entered into the question; but how often are we able to find such a condition in this way? I bring up the case as a practical one, to show the fallacy of depending on healthy alveolar structure where we know the root-canal work is intrinsically defective, and what the possibilities in the case of such work may be in the future.

This is no question that can be settled within the few moments allotted to it for discussion, but I feel that if I leave this point with you, I have accomplished a great deal—namely, there is no such thing as safety in the control of focal infections unless the focal infection is eradicated and the end of the root is hermetically encapsulated, so that it is absolutely free from the possibility of microbic attack in the future.

Dr. D. W. McLean, Mount Vernon, N. Y. That Dr. Mayo's name is one to conjure with in dentistry today, there cannot be any doubt; this assemblage of dentists is sufficient proof. When Dr. Mayo stood before our profession two or three years ago, and, summing up the findings of various research workers on the subject of focal infections, challenged us with the statement that the next great step in preventive medicine must be taken by the dental profession, he assumed a position absolutely unique in this profession. His statement then marked an epoch, and I venture to say that never in the history of any profession has there been such a change of ideals, such a groping for new facts and knowledge, such a revolution in technique, as has taken place in our profession in that short time. Up to that time it was considered by most of us a safe and proper procedure to half-devitalize pulps and half-fill root-canals with cotton medicated with iodoform, or with mummifying paste, or almost anything else that was small enough to go into a root-canal. We had no radiographs. We never knew if we reached the end of the root, or how near to it we were. Today, in looking at radiographs of those teeth we must keep that fact in mind. It is not well to knock the work of a few years ago, or to slur the work of the men who did it. Sometimes today we must make four or five attempts to fill a root-canal, and radiograph the canal after each attempt. What hope could there be to fill these root-canals without the help of the radiograph?

Dr. Mayo and Dr. Rhein have covered the general features of the subject so thoroughly that there is very little more to say about it. We all approach these

subjects from different angles, otherwise the discussion would be nothing but a chorus; and I approach the subject from the angle, as most of you do, of the very busy and very tired general practitioner. The question is, What does this subject mean to you and to me practically, in our everyday work, as general practitioners? You hear men say that, for all the talk of focal infections, they see very little of them and they doubt if there is as much fire as the tremendous amount of smoke would indicate. I can only quote what Dr. Weston A. Price is fond of quoting: "A new truth is a new sense." If we study and look for these cases we will develop a sense of sight that will discover them on every hand.

A patient comes into our office, and we remove a tooth. The patient tells us when we see him again that he was laid up with a severe cold, or an attack of grip or rheumatism, following the extraction. What does that mean? It means a focus of infection. It means we have stirred up a hornet's nest in the alveolar tissue surrounding that tooth, that there has been a fresh invasion of the patient's system, and the reserves were called out; and while the reserves and the germs were fighting it out, the patient went to bed; he was sick.

There lies our tremendous responsibility. We are fond of criticizing the medical profession for the tendency some of its members have to go over our heads and condemn teeth. About a week ago a patient came into my office and said she wished a root extracted, because she was suffering from rheumatism. The physician had examined the mouth, and the root was the only thing he found there to cause the trouble. There was a great deal of pyorrhea, but the patient was quite indignant when I spoke of it, and said the physician had examined the mouth and said there was no pyorrhea! We all have had cases where the physician has sent the patient to the radiologist and has made his dental diagnosis as well as medical, and we recall the fact that that is practicing dentistry, and even a physician cannot practice dentistry without violating the law of the state. But he is often justified. Suppose you were a physician treating a case of focal infection with secondary lesions. Suppose you had eliminated almost everything else, and you felt sure the trouble was in the mouth and the teeth, and you sent your patient to a dentist who for the past ten years had been suffering from mental ankylosis. What would you do? You would be justified in taking that patient away from that dentist and putting him in more competent hands. Very often, however, the same condition exists the other way around.

I have been treating and I hope to show you the radiographs of a patient with acute arthritis. We have eliminated every focus of infection in the mouth with the exception of one suspicious vital pulp. So far we have found nothing. That patient ought to be in the hands of a competent group of men working together. I have referred her to her physician—I did so early in the treatment of the case—and he said her rheumatism "came from the air." What should the dentist do in a case like that? The subject of focal infections lies out in No-man's Land between the two professions, *and neither one alone* can treat it thoroughly and to its full completion.

I was impressed with Dr. Rhein's statement as to the prevention of focal infection; and the body of men in this State Society today that is doing the biggest work toward saving people from these focal infections is your Oral Hygiene Committee. It boils down to a question of prevention; of examining the teeth frequently. We must spend our time filling pinhole cavities, instead of treating pulps—or capping them, which I believe to be equally bad.

When it comes to preventing focal infections, there are a lot of questions of technique that cannot be entered upon here. As to selection of the root-canal filling material—it takes courage to say it, but personally I do not believe chloro-percha is the agent that is going to do it, though this is a question that time must prove. Chloro-percha is absorbent, and it is neutral. A much better material

to my mind is the bismuth-iodoform-formocresol paste. We seldom fill a canal when every bit of infection beyond the apex has been destroyed. The surgeon can destroy that infection absolutely with the knife, but when he cannot remove it I note that he is not very prone to inject a foreign body, especially a neutral absorbent foreign body like gutta-percha, and seal the case up.

What teeth shall we remove, and what teeth shall we save? Dr. Rhein has certainly covered that question thoroughly. We must study the case. If there is a secondary complication which is serious, most certainly those teeth should not be left there. On the other hand, there has been a widespread extraction of teeth in the last two or three years that has been absolutely uncalled for, and when the pendulum has swung back between the two extremes and has come to rest I believe we shall extract infected teeth only in cases that show secondary lesions.

When root-canals are ready to fill, we should "culture" them in all suspicious cases. The culturing of a tooth is a simple matter. The local bacteriologist will supply you with tubes of broth or nutrient agar for that purpose. The tooth is isolated, washed with alcohol and dried, and a sterile instrument is passed through the apex and then gently drawn across the agar; the cap is put on the tube, which is then sent to the bacteriologist.

When we think the canal and the tissues beyond are sterile, we place a small wisp of cotton in the canal, and leave it for two or three weeks; then carefully remove it and clip off from the apical end an eighth of an inch, drop it into broth, and send that for culture. If the report comes back that some form of streptococcus, viridans or hemolyzing, or even staphylococcus, is present, the sterilization of the apical tissues has failed, and the tooth should be removed.

We must remember that a tooth may be infected and show no lesion in the radiograph. Men frequently speak of seeing infection in a radiograph; it can't be done. We may see things *from which we deduce infection* but the only thing which *will actually show infection is the microscope.*

One other important point is to be sure not to forget the vital pulps. Last October at the National meeting, Dr. Rosenow reported cases where the infection was found in capped pulps. Infection taken from a putrescent pulp was injected into rabbits, and in 50 per cent. produced pulpitis in perfectly sound teeth. We know that the bacteria mixed up in the process of caries penetrate beyond the actual zone of decay and may reach the pulp. Or again, circulatory changes may take place there, the resistance may be lowered, and that pulp may become the seat of an infection which is hematogenous in its origin. Or, in the case of the capped pulp, the infection may enter the pulp direct—and I believe a great many of these pulps are infected before they are sealed.

I have been very much interested in the subject of encapsulation, as we all have. Unless a root-end can be hermetically sealed the space between the root-end and the gutta-percha becomes a lodging-place for bacteria, and the encapsulation is a source of danger rather than a protection. And I believe the chloro-percha will not adhere, for the reason that the root-end is invariably moist.

The statement has been made that the chloroform in the mixture will dry the end of the root, and the mass will adhere. I have felt very sure this was not the case, but for some time was at a loss to prove it. I finally set up some extracted single-rooted teeth in fresh meat (which is moist) and buried them, to the crowns, in plaster of Paris. The roots were then encapsulated, some with chloro-percha and gutta-percha points, and some with Callahan's rosin solution followed by chloro-percha and points. They were then radiographed, and laid aside for twenty-four hours, after which the plaster of Paris and meat were removed. It was found that not one of the chloro-percha encapsulations had adhered to the root, though all had adhered tenaciously to the meat. The encapsulations containing the rosin solution showed a

tendency to adhere, but in every case there was a considerable fringe of material which did not adhere in the slightest. The teeth were dropped in ink for twenty-four hours, and the ink proved the facts by penetrating under the encapsulation.

Dr. Weston A. Price, Cleveland, Ohio, then gave an illustrated lecture, entitled "A Study of the Conditions which Indicate Whether or Not a Tooth Should be Extracted."

[This lecture is not published here for the reason that no revised manuscript was received from the author.—Ed.]

Adjournment.

Friday—*Morning Session.*

The society was called to order by the president, Dr. A. C. Rich, at 11 o'clock, in the Convention hall. Dr. Wm. Dwight Tracy of New York read a paper entitled "The Next Quarter-Century in Dentistry: A Prophecy Based on the Needs of the Profession and on Our Hopes for Its Development."

[This paper will be published in our next issue.—Ed.]

Adjourned until the afternoon session.

Friday—*Afternoon Session.*

President Rich called the meeting to order at 5 o'clock, and Dr. A. W. Twiggar of Ossining, N. Y., read the Report of the Executive Council.

On motion, the report of the Council was approved.

The next order of business was the installation of officers.

Dr. G. B. Beach, of Syracuse, the newly elected president, was conducted to the platform.

Dr. Amos Rich. *Dr. Beach,*—After your many years of faithful and arduous service, this body has seen fit to select you for this important office. I congratulate this society upon its selection, and it is with considerable pleasure that I hand this gavel over to you, and wish you all success in the discharge of your duties.

Dr. G. B. Beach. In assuming the office of president of this society, I take it with mixed feelings. It is an honor which has come upon me so suddenly as to hardly permit me to express myself intelligently. I can only wish for the co-operation of every district, and of every man in every district. We have troublous times about us, but there is no reason why our dental affairs should suffer materially. More work brings us closer together, and makes us more dependent one upon the other.

In this beautiful hall perhaps it is a fitting time to express our appreciation of what our retiring president has done for us in providing this beautiful place of meeting and these beautiful patriotic decorations, which are a great inspiration to us.

I ask you to aid me in this great work which is before me, and I feel you will.

I thank you, Mr. President and gentlemen, for this honor, whch I very deeply appreciate.

Dr. A. L. Swift, New York. I would move a vote of appreciation to the City of Saratoga Springs, and to our retiring president, for all the courtesies which have been extended to us, and for permitting us to meet in this beautiful hall amid these beautiful decorations.

The motion was carried.

Adjournment.

Banquet.

An informal banquet was held on Friday evening, at the Masonic Temple, which was largely attended by the members and guests. Dr. Amos C. Rich acted as toastmaster.

Dr. Rich. We come now to the part of the program which is one of the most pleasing duties the president has to perform. I refer to the awarding of the William Jarvie Fellowship Medal. It is my pleasure this year to be able to pre-

sent it to Dr. George H. Wilson of Cleveland, Ohio, who will thus be made a Fellow of the Dental Society of the State of New York.

Dr. Wilson,—Through the generosity of Dr. William Jarvie, actuated by his interest in this society, a Fellowship Fund was created, and each year some dentist of the United States or Canada who is considered worthy of the honor is made a Fellow of the Dental Society of the State of New York, because of his distinguished service to the profession of which he is a member. You have been selected this year to become such a Fellow. Your record speaks for itself: it is known by the profession. It is therefore unnecessary for me to refer to it—it was sufficient for the committee to select you as its choice. It becomes my duty, in my official capacity, to pronounce you a Fellow of the Dental Society of the State of New York, in token of which I hereby confer upon you this decoration, which designates you as such. It is my privilege, in my personal capacity and on behalf of the society, to congratulate you upon your preferment.

Dr. George H. Wilson, Cleveland, Ohio. *Mr. Toastmaster, ladies and gentlemen,*—I hardly know what to say at this time, because it is an honor I never expected would come to me; and when your president wrote me and informed me that I had been so selected, it was a question in my mind whether he could possibly be right, or whether there was not some error.

Friends, I feel this recognition is the greatest honor that can be conferred upon any member of the profession, because it is a recognition of what he has done. It is not asking him to do something in the future. It is a distinction. It is a joy, and it is a sorrow—because it is placing one on a pedestal, as it were, and he cannot help but feel a responsibility to his profession. He feels he must be a model, that he is one to whom the younger men will look up, and they will size up the profession by their models; so it is a great responsibility placed upon one. I have prided myself that I was independent in action and speech, that I was neither a model nor a devotee to some other mentality; but now, as a model, I am under greater obligation to consider the effect, upon the rising generation, of my actions and speech. I have had a good deal of faith in the Greek philosophy of Hedonism, that what we do, we do because of the pleasure it gives us. I believe that such a motive is worthy, provided we have a proper control. If we are blessed with a mother who had great faith in the word of the Teacher of Galilee, and most of us have been, that it is more blessed to give than to receive, then Hedonism is a worthy mainspring of action, because it gives us pleasure to do for others.

There are two reasons why I am especially glad that this honor came to me at this time—one for my own sake, and the other for the department of dentistry which I represent, if I represent anything at all. I have felt that the prosthetic department of dentistry was not looked upon by the mass of the profession as it should be. That was one of the reasons I never aspired to this honor, because I thought it was impossible for the profession at this time to properly estimate prosthesis; therefore I am especially pleased that it comes to me as a representative of prosthetics. At the present time, I cannot help but feel that the prosthetic department is assuming a new dignity. We have had it intimated tonight how that was brought about—by the famous article of Hunter, when he spoke of "American septic dentistry." It hurt us, it jarred us, but it did us good. For that reason we cannot but think, if we think logically, that the prosthetic department must be one of the greatest departments of the future for this generation; at least I hope our operative department will so teach that there will not be that need for prosthetic dentistry in the future. Preventive dentistry is the subject that should be taught and practiced as far as possible by the operators, but it is not possible for them to remedy the harm we have done in the past, therefore we must have our prosthetists. I am constrained to say the probabilities are that at our next Na-

tional meeting an organization will be formed of the prosthetists of our profession, and we hope it will mark a new era in the progress of dentistry.

I said I felt this was the greatest honor that can come to any man in the dental profession. I will say it is the greatest honor a dentist can have in his life, save one, and that is the honor of worthy children. I believe every mother and father present will agree with me that the greatest honor in this life is our children, and especially if a kind Providence grants to us such children that they are an improvement upon the parent, that they are better physically and mentally. Then again, if our sons seek to follow our own profession we can feel that our life is not in vain, and our name, if we have made one, does not cease with our death, but goes on for another generation at least.

I feel this medal, and what it represents, is the greatest honor a profession can give to its members. I am glad Dr. Jarvie found it in his heart to create this foundation, because it is said that the dental profession is very ungrateful. They will take everything and give nothing. This medal gives the lie to that statement. It shows to us that the profession does acknowledge and is thoughtful of those who are working along in a quiet, unpretentious way, and it is giving us the bouquet before our death.

I thank you, one and all, for the honor you have bestowed upon me.

Dr. Rich. It is my privilege to make a special presentation to one who has unselfishly given his time and his money for the benefit of dentistry in the State of New York. Ladies and gentlemen, I refer to Dr. William Carr, of New York. By resolution of the Council, engrossed resolutions commemorative of his services have been prepared, and it is my privilege to present them to him this evening. Dr. Carr, it gives me exceeding pleasure to be the person to present these resolutions of appreciation to you.

Dr. William Carr, New York. *Mr. President, ladies and gentlemen, members of the New York State Dental Society,*—This is one of the proudest moments of my life, for which I thank you sincerely, as I believe that these resolutions express your appreciation of my activities as chairman of the Law Committee for the enforcement of the dental law. Thirty-three of the best years of my life have been given unselfishly to the enforcement of this law, in the endeavor to raise our professional standard. I have been severely criticized by friends of illegal practitioners whom I have prosecuted, and criticized by legally qualified practitioners who employed in their offices men practicing illegally. Under existing laws it is much easier than heretofore to prosecute offenders successfully. The state will never be entirely rid of them, as they are like the Lord's poor—always with us. I earnestly beseech you to give hearty support to those having charge of the enforcement of the dental law, giving them whatever aid is within your power.

Again I thank you sincerely for this expression of your appreciation.

In addition to the presentation of the Fellowship medal to Dr. Wilson and the resolutions of appreciation to Dr. Carr, the audience listened to after-dinner speeches from Dr. Donald M. Gallie, Chicago, Ill.; Dr. A. P. Burkhart, Auburn; Dr. Frank B. Darby, Elmira; Mrs. H. W. Gillett, New York; Dr. Augustus S. Downing, Asst. Commissioner of Education, Albany, and Dr. H. J. Burkhart, Rochester.

Dr. Rich. Permit me from the bottom of my heart to thank you all for your cordial support and your continued presence here this evening until this late hour. My guests and speakers, past presidents, and charter members, permit me to extend my thanks.

Dr. Burkhart. I want to move a resolution of thanks to Dr. Gallie for coming here, and for the greetings he has brought to us from the Illinois State Society.

The motion was carried unanimously.

Adjourned.

New Jersey State Dental Society.

Forty-eighth Annual Convention, held in Atlantic City, N. J., July 17 to 19, 1918.

WEDNESDAY—*Morning Session.*

THE forty-eighth annual convention of the New Jersey State Dental Society was held at Young's Million Dollar Pier, Atlantic City, N. J., July 17, 18, and 19, 1918.

President Raymonde A. Albray, Newark, N. J., called the convention to order at 10.30 o'clock.

The Rev. ROBERT ARTHUR ELWOOD, Atlantic City, opened the meeting with prayer.

The PRESIDENT. I will ask Dr. Elwood to deliver the address of welcome.

[Dr. Elwood's welcoming and patriotic address was enthusiastically received.]

The PRESIDENT. We will now listen to a patriotic address on "The Fight for Democracy" by Mr. Chas. Richard Williams of the National Security League.

[Mr. Williams gave a timely and interesting address contrasting Hun with American ideals, which was highly appreciated by his audience.]

The PRESIDENT. The first order of business is the roll-call.

On motion by Dr. WOOLVERTON, duly seconded, the roll-call was dispensed with.

The PRESIDENT. Next in order is the reading of the minutes of the last meeting.

On motion of Dr. WOOLVERTON, duly seconded, the reading of the minutes was dispensed with.

Dr. WOOLVERTON. Mr. President, I move that the minutes as printed by the DENTAL COSMOS, which have been distributed to each member of this society, stand approved as printed unless there are some corrections to be made.

The motion was seconded and carried.

The PRESIDENT. The next order of business is the annual Address of the President.

Vice-president George W. Wakeley was called to the chair, and President Albray read the annual Address of the President, as follows:

President's Address.

By RAYMONDE ADAIR ALBRAY, D.D.S., Newark, N. J.

Mr. Vice-president, fellow members and guests,—The meeting which opens today is the culmination of a great deal of thought and work on the part of many of our members, and it gives me great pleasure to bid you all welcome.

An excellent program has been provided for you by the various committees. Dr. Egel, chairman of the Essay Committee, has secured men of national reputation to address you; Dr. Stillwell of the Clinic Committee has striven to obtain clinicians who are worth while, and I am sure you will agree with me that he has succeeded admirably. Make it a point to attend both the lectures and the clinics, that you may acquire knowledge, that your patients may be better served, and that our essayists and clinicians shall be accorded the honor which is due to men who sacrifice their private interests for the enlightenment of the profession and the good of the people.

Dr. Callahan, chairman of the Exhibit Committee, has, in the face of uncertain traffic conditions, decreased production, and labor shortage, procured a remarkably large and interesting manufacturers' exhibit which will prove an inspiration to our members.

The work of the various committees throughout the year has been well done, and to the chairmen and members of all committees, to Dr. Halsey our treasurer, to Dr. Gelston, who has devoted a great deal of time and energy to the proper staging of this convention, and to Dr. Forsyth, our secretary who so successfully carries on the greater part of the society's work, I say "Thank you" for the hearty support and co-operation which you have given your presiding officer.

The past year has been a trying one for all. A spirit of unrest and uncertainty has pervaded our daily lives. We have seen our relatives and friends depart for camp and the front. Many of our fellow practitioners have given up practice to enter Government service. Those of us who are here do not know what the future may hold. The period of reconstruction after the war will undoubtedly be a trying one. Some of our members may require help, our country may need far more than we have been called upon to give. Therefore it behooves us to maintain our organization and strengthen it in every way possible, that it be in a position to exert its greatest power at the time when it will do the most good.

I ask that petty jealousies and differences which have crept into one or two of our local societies be forgotten, and matters so adjusted that harmony and good feeling will prevail throughout our entire organization. We all wish for the advancement of dentistry, and it is largely through our societies that this is accomplished. Discord, even to a slight degree, seriously hampers the working of an organization and detracts largely from its efficiency and power. There is sufficient of combat "over there" to suit any one. Let *us* have peace.

PAYMENT OF DUES.

A matter that I wish to bring before you, which has been the cause of quite a little confusion, has necessitated several extra meetings of the Board of Trustees and has caused Dr. Forsyth a tremendous amount of extra work, is the carelessness of local society secretaries in collecting dues and making remittances. Because of this remissness on the part of several secretaries, quite a number of our members were suspended from the National Dental Association and lost several copies of the *National Dental Journal.* Promptness in collecting dues and promptness in making remittances of State and National Society dues to our secretary will greatly facilitate and lighten his work, will insure membership in the State and National societies, and will strengthen the local society. A member who has paid his dues is always a better member than one who has not done so, and a society made up of men who consider dues an obligation to be met promptly is bound to be a success. See that yours is this kind of a society!

Recommendation No. 1. In this connection I wish to make a recommendation to the effect that any member of a local society, or a member of the New Jersey State Dental Society who is not a member of a local society, whose dues are not paid by March 1st of any year be suspended from all privileges of the local, State, or National societies until January 1st of the following year, and unless the arrearage in dues and the next year's dues are paid by that date, he be automatically dropped from membership.

MEMBERSHIP.

Recommendation No. 2. The members of our societies should be selected with some degree of care and with an eye to their qualifications in maintaining the standard of the society. For the protection of the membership of the local, State, and National organizations, I recommend that a ruling be made that the names of all applicants for member-

ship in local societies be referred to the secretary of the State Society before a candidate can be elected, that the record of the applicant can be investigated and transmitted to the local society.

The secretary of the State Society, of course, would not be invested with power to say that a man could or could not be accepted, but simply empowered to send the local society any data in his records as a guide in determining the desirability of the applicant.

It has not been possible to secure the names of all of our members who are in Government service, so in making up the program it was deemed best not to print any names, but simply dedicate a page to those who have entered the army or navy. We are proud of the number who have responded from New Jersey, and especially gratified to know that many of them have been advanced in rank. I ask that every man in this room send a note from Atlantic City to at least one of our members who are in active service, to let the boys know that we are thinking of them.

One matter of considerable importance in which our society had a part was the recognition by the Government of the advisability of having dentists serve with the local exemption boards. This was taken up at a meeting of the Board of Trustees, and brought to the attention of the Adjutant-general of the State. He in turn communicated with the authorities in Washington, and shortly afterward orders were promulgated which made possible the appointment of dentists to these boards.

Unfortunately the impression has gotten abroad that New Jersey dentists are not doing their full share of work in making men dentally fit for the army or navy. I regret this exceedingly, because it is not only untrue but unjust. The dentists of our state are fully as patriotic as those of any other state, and I know that a great deal of dental work has been done and is being done for soldiers, sailors, and recruits, and also in various parts of the state for the families of soldiers and sailors in connection with the Home Service section of the Red Cross. That our men have not considered it necessary to run to a mail-box and send a postal card every time a filling was put in the tooth of a soldier should not be taken as an indication of uninterestedness, disinterestedness, or lack of patriotism. Quite the contrary.

New Jersey dentists were early in the field and organized for the purpose of rendering free dental service to the men entering the army or navy, and they are going to keep right on doing their bit in this as well as in other ways. In Newark, since January, over three hundred members of soldiers' or sailors' families have been cared for by dentists of the district, working through the Home Service section of the Red Cross.

EXEMPTION FROM JURY DUTY.

Recommendation No. 3. Our old friend "exemption from jury duty" is before us once more, and with the proper support from our members probably could be made effective, and I recommend that the incoming Legislative Committee make a strenuous effort to secure the passage of such legislation.

AMENDMENT TO THE DENTAL LAW.

Recommendation No. 4. The New York dental law contains a clause which has been upheld by the Supreme Court of that state. The clause in question is, in effect, that "It is illegal to practice dentistry under a false or assumed name, or under the license or registration of another person of the same name, or under the name of a corporation, association, parlor, or trade name." And I recommend that the Legislative Committee be instructed to have such an amendment to our present dental law framed, and endeavor to secure its enactment.

During the past year the State Board of Registration and Examination in Dentistry has been very successful in the prosecution and conviction of illegal practitioners in the state. The Attorney-general of the State has been most gener-

ous in the time devoted to the prosecution of cases.

Recommendation No. 5. I think it would be a timely and courteous action on the part of this society to extend a vote of appreciation to the board, and to the Attorney-general, and so recommend.

Recommendation No. 6. Each year after the convention closes there is a vast amount of business which has to be finished up, the details of which are familiar only to the officers of the society who had the arrangements in charge. The question of just when the newly elected officers assume charge of the affairs of the society has never arisen, and I recommend that the society specify that the terms of officers begin on the 1st day of September following their election. This will allow sufficient time for those who have arranged and conducted each annual meeting to complete all business and turn over the affairs of the society to the incoming officers in proper shape.

NEW JERSEY DENTAL JOURNAL.

Recommendation No. 7. The *New Jersey Dental Journal* is now in its seventh year. It has from a number of standpoints been a success. Articles published in its pages have been reprinted in other journals, at home and abroad. In various ways it has saved this society money in considerable sums; printing the convention program has effected a saving of nearly five hundred dollars per year to the society. Other state societies have inaugurated journals or bulletins patterned after ours. The members of the Publication Committee have labored hard to give the society an interesting and useful monthly magazine, containing original articles, valuable reprints from other publications, and news of the local societies in the state. In most instances our support has been meager, and repeated attempts to arouse enthusiasm for the *Journal* have met apathetic response or none at all, and I therefore recommend that the society discontinue the publication of the *New Jersey Dental Journal.*

ELECTION OF OFFICERS.

You have all had a copy of the proposed changes in the by-laws, and I wish at this time to urge you to adopt those sections which have to do with the election of the officers of this society and the members to be recommended to the Governor for appointment to the State Board of Registration and Examination in Dentistry. The practical effect of adopting this system of elections is as follows: (1) Tiresome nominating speeches will be a thing of the past. (2) A great deal of valuable time will be saved, thus making it possible to utilize a whole morning session for other matters.

The proposed scheme is simply that which is in vogue in most of our municipalities. There are many other features to commend the plan, but I do not think it necessary to enumerate them here, as I know you all have sufficient intelligence to see them. I consider that this plan of electing officers will be for the best interests of the society, and again urge you to vote for its adoption.

Recommendation No. 8. Several parts of our present by-laws are rather vague or involved and could be misinterpreted. To correct this condition I recommend that a committee be appointed to make the wording of these portions more explicit.

I wish to extend the thanks of the officers of the society to essayists, clinicians, exhibitors, and members who have aided in making this meeting possible, and I hope that each and every one will go away feeling well repaid for having attended the forty-eighth annual convention of the New Jersey State Dental Society.

Chairman WAKELEY. I will appoint as the Committee on the President's Address, Dr. Van Gieson, Dr. Barry, Dr. Gleason, Dr. Faupel, and Dr. Woolverton.

There being no proposals for membership and no appointment of special committees, the President next called for the report of the Committee on Necrology.

REPORT OF COMMITTEE ON NECROLOGY.

Dr. GEORGE M. HOLDEN, chairman, reported as follows:

Since our last meeting four members of the New Jersey State Dental Society have passed away. As an expression of respect to their memory, we request that the members rise while the names are being read.

Dr. RICHARD F. BORDEN, Bound Brook, N. J., formerly of Red Bank, N. J. Began practice about 1865; joined this society in 1907. Died in 1918.

Dr. JACOB P. MILLER, Bayonne, N. J. Graduated from the New York College of Dentistry in 1913; joined this society in 1914. Died in January 1918.

Dr. P. J. WILSON, Newark, N. J. Began practice in 1866; joined this society in 1897. Died January 1, 1918.

Dr. HENRY B. JOHNSTON, Dover, N. J. Graduated from the Baltimore College of Dental Surgery in 1902; joined this society in 1912. Died March 31, 1918.

RESOLUTIONS OF REGRET.

Whereas, by an act of Providence we have suffered the loss of our fellow member. Dr. Richard F. Borden; be it

RESOLVED, That we, the members of the New Jersey State Dental Society, hereby express our sorrow and sympathy, and record our appreciation of his faithful services; and be it further

RESOLVED, That these resolutions be placed upon the minutes of this society, and that a copy be sent to the family.

GEO. M. HOLDEN, *Chairman*,
CHAUNCEY M. F. EGEL,
CLARENCE O. S. HOWE,
CHAS. A. RICE,
Committee.

Similar resolutions are presented for adoption in the cases of Dr. J. P. Miller, Dr P. J. Wilson, and Dr. H. B. Johnston.

Motion was made and carried that the report of the Committee on Necrology be received and ordered placed upon the minutes, with instructions to carry out the recommendations.

Sundry reports were called for by the President, and such as were ready, including those of the Secretary and Treasurer, were accepted and ordered embodied in the minutes.

The PRESIDENT. Next is the report of the delegate to the National Dental Association, Dr. Fowler.

Dr. HENRY FOWLER. *Mr. President, and gentlemen of the Convention,*—Your delegate to the National Convention attended, and as most of the members have no doubt read in detail the report of the activities of that convention, it was not deemed necessary to submit to you a lengthy report. I wish, however, to report that the New Jersey State Dental Society is now in better standing with the National organization than at any time heretofore. The membership of our society is very high in proportion to the total number of practitioners, as compared with the other states, and we feel that the progress which has been made by our society is very good indeed.

The PRESIDENT. The next order of business is the report of the Publication Committee. I have not prepared a separate report of the Publication Committee, as I think the report in my presidential address is sufficient.

PREPAREDNESS LEAGUE COMMITTEE.

We will now hear the report from the Committee on Preparedness League, Dr. J. B. Stevens, chairman.

Dr. J. B. STEVENS. *Mr. President and gentlemen,*—The Preparedness League work in the State of New Jersey began some time before the declaration of war by President Wilson. The committee was organized largely through the efforts of Dr. S. M. Hinman of Cranford, N. J. We began a campaign of dental preparedness which finally culminated in a meeting of the representative men from all over the state, at the Battin high school, in Elizabeth, N. J.

Dr. Egel of Westfield was appointed chairman, and as many of you know, we started out with high hopes and bright prospects indeed. After considerable discussion, upon motion by Dr. Hinman,

our further activities were turned over to the Board of Trustees. At the next meeting of the board, on account of the sudden illness of Dr. Hinman, I was appointed chairman of the Preparedness Committee. Dr. Hinman had collected a small sum for the purposes of the organization. Total receipts as reported to me, by our treasurer Dr. J. B. Goodall, was $346.00, the expenditures being $344.05, leaving a balance of $1.95. Our secretary, Dr. J. C. Forsyth, has the data. Dr. Goodall is in the service, and has requested me to make the report for him.

On account of the complicated procedure required, our men have not made a detailed report of the work done for recruits. Heretofore they did not think it necessary. However, we now have a system (a franked card, form 3-D), devised by Dr. Ash, that will facilitate the matter, and hereafter our work for the registrants will be recorded as it is in other states, and we will make a better showing, on paper.

Camp Dix is prepared to do all kinds of dental work. Dr. Albray and I went down a few weeks ago, and we found a wonderful establishment—all that could possibly be desired. The men are furnished with all the modern facilities of a dental office, even to the wonderful S. S. White nitrous oxid and oxygen machine.

On motion the convention adjourned until the evening session at 8 o'clock.

WEDNESDAY—*Evening Session.*

President Albray called the meeting to order at 8.30 o'clock.

The PRESIDENT. I take pleasure in introducing to you Dr. Charles F. Ash, New York City, Director-general for the United States, Preparedness League of American Dentists.

Dr. CHARLES F. ASH. *Mr. Chairman and gentlemen,*—From New Jersey we have received records of 234 operations. It is almost unfair to New Jersey to print the records of the operations, for the reason that I am satisfied you have done many thousand operations, and you should have the full credit for it. The people in the other states do not know that you are doing the work as I do. When we read the record, or the report, and see 234 operations as all that is credited to New Jersey—just a couple of hundred operations, whereas the other states have been doing some thousands —it is not the kind of showing that should be made in justice to the men who are doing the work.

There have been several different types of form cards that have been sent out. Here is a card that we had used for this purpose [card produced]. I have endeavored to simplify the cards so as to make them more simple, and make a minimum amount of work in recording the operation, and this card which you will receive now is the one Dr. Stevens has asked me to send to you through the local directors of the League. There is no return portion on it. Either these will be handed out to the registrant, and he will be referred to the dentist who will do the work, or else he will receive this notification card through the mail. The applicant then is given a dental examination. After the card gets into the hands of the registrant he takes it to the man who is going to do the work for him, and the dentist will be instructed how to use these cards. This circular [exhibiting] contains instructions to dentists, and you are requested to read it very carefully. This card is well adapted for a record for a Government report. Turn it over and draw a single line through the address of the registrant, and then mail at once; no stamp is needed. In this lower corner, on the other side of the card, you will observe it says, "Notice to Postmaster: When the address on this card has been cancelled, please deliver to 50 East 42d st., New York City." It is a simple matter to record your operations here. You can sign the card, scratch out the address, and drop it in the mail-box, and by so doing we will be able to have these records for the Surgeon-general's Office, and we will be able to give to the New

Jersey Dental Society the credit which it so justly deserves.

The PRESIDENT. I trust that every man in the room understands the proposition, and that you will all follow the speaker's instructions, for the good of the profession and for the good of the men making up our fighting forces.

We have with us tonight Mr. SAMUEL G. SUPPLEE of New York, who will favor us with a lecture on the subject of "Classification of Tissue Conditions for Convenience in Discussing Prosthetic Problems."

[This paper is printed in full at page 996 of this issue of the DENTAL COSMOS.]

The President next introduced Dr. THOMAS G. ALLER of Philadelphia, who addressed the society on the subject of "War Surgery," as follows:

War Surgery.

Dr. THOMAS G. ALLER, Philadelphia, Pa.

Mr. President and gentlemen,—I am sure that the well-known saying of General Sherman has been very forcibly brought home to us all during the present war. However, as we know, from evil sometimes comes good, and through all this war we ought to be as optimistic as we possibly can, and see the several things that have been given to us, particularly in the arts and the sciences, and especially in dentistry and surgery.

Looking back over the history of surgery, there are really three great periods: First, the period from its incipiency up to the time of Ambroise Paré and Larry, who were surgeons of Napoleon's army. Up to that time it was very academic; there was very little in the way of surgery, or anything called by that name, that was of service in the army. They were the orignators of the system, in a way, that we have today. If some of the cases we have pictures of tonight had been found on the battle-field at that time, undoubtedly they would have been condemned to death. At that time if a man was mutilated about the face and jaws to such an extent that it looked as if he could never recover, they deliberately put the man to death. At the present time, however, a very large percentage of such cases are saved; when a man is found on the battle-field showing any signs of life, of course he is taken care of and every facility is afforded him to be restored.

After the time of Ambroise Paré there was no particular advance until Lister, who brought out antiseptic surgery and thus was developed the aseptic surgery of the present.

From that time up to the beginning of the present war no further great step had been taken—or no great advance made. Certain instruments had been devised and operations planned and carried out, but nothing of such decided importance as the things that are now being brought out, namely, the speedier handling of wounded and the shortening of the time of the healing of a wound. Reports come from different parts of Europe showing the wonderful progress that has been made, and giving statistics. The question arose as to just what was the cause of some men's getting good results in various areas by certain methods? Was it the technique, or the medicaments they used? It was found that there was one factor common to all the men that got the good results—they were men who saw all their cases early.

If a case is seen within three hours after being wounded, or at the outside not beyond eight hours, there is a very much better chance for early recovery, or recovery without infection, because by that time the germs are still superficial. True it is that the tissue is frequently very severely lacerated and contused, and if given time it will undoubtedly slough away. The fact of getting cases early allows the surgeon to cut away that tissue, or the part that is so badly bruised, and cut away at the same time the superficial infection.

I now want to show you some slides and bring out several points—one of great importance, namely, the importance that dentistry and oral surgery has attained in this war; also to show

you the difference between the older and newer methods—that is, allowing wounds to heal by cicatrization, or immediate surgical interference. The new idea of seeing cases as early as possible is of greatest importance. Therefore the Surgeon-general has formed units composed of a head surgeon, eye surgeon, nose-and-throat surgeon, an oral surgeon, and two dental surgeons. That constitutes what is called a "head" unit; these head units are sent out to the hospitals where they will be able to see and treat the cases within a few hours, preferably three hours, after they are wounded, and in that way save very materially the length of time the men must remain in the hospital. [At this point Dr. Aller threw pictures on the screen.]

On motion, duly seconded, a vote of thanks was tendered to Dr. Supplee and Dr. Aller for the interesting papers read to the convention.

On motion, the convention adjourned until the Thursday morning session at 9 o'clock.

THURSDAY—*Morning Session.*

President Albray called the meeting to order at 10 o'clock.

The PRESIDENT. The next order of business is the election of officers.

Dr. HOPKINS. Before we proceed with the election, Mr. President, I rise as a special privilege. I would like to present a resolution. The members here see a beautiful service flag on the wall behind the president's chair, which was made and presented to us by the wife of one of our members. I move a rising vote of thanks to that lady, Mrs. Wm. H. Gelston of Camden, for making and presenting to the society that beautiful service flag; also that the secretary be instructed to present this resolution to her.

The motion was seconded and unanimously carried.

ELECTION OF OFFICERS.

The next business in order was the election of officers for the ensuing year, which resulted as follows:

President—Dr. George W. Wakeley.
Vice-president—Dr. Charles F. Jones.
Secretary—Dr. John C. Forsyth.
Treasurer—Dr. Joseph G. Halsey.
Delegate to National Dental Association—Dr. Wm. E. Truex. Alternate, Dr. E. Stillwell.
Nominations for Examining Board—Dr. Chas. A. Spahn, Dr. Thos. J. McLernon, Dr. Eugene Griggs, Dr. Wm. I. Thompson, Dr. Wm. H. Gelston, Dr. Geo. H. Grim.

Dr. BARRY. I move that the names of the six men selected by the society be sent to the Governor, and be recommended to the Governor, from which he shall select two men for the places of the retiring members of the State Board, and that no comment shall be made with respect to any of the men. (Motion carried.)

Board of Trustees.

The following names were submitted by the component societies:

Atlantic: Dr. M. P. Shoemaker.
Bergen: Dr. Walter A. Tracy.
Central: Dr. Edward C. Stillwell.
Clinical: Dr. R. B. Van Gieson.
Hudson: Dr. Chas. Faupel.
Mercer: Dr. Geo. W. Wilkens.
Middlesex: Dr. W. W. Hodges.
Monmouth: Dr. Frank L. Manning.
Passaic: Dr. Chas. A. Rice.
Plainfield: Dr. Frank T. Clawson.
Southern: Dr. Wm. H. Gelston.
Tri-County: Dr. L. R. Fritts.
Union: Dr. J. A. Jones.

RESOLUTION REQUESTED BY EXHIBITORS.

Dr. LEONARD. Mr. President, I desire to offer the following resolution of the exhibitors at this meeting:

Whereas, Dr. Wm. H. Gelston has shown such faithful and impartial activities toward the exhibitors, to make the forty-eighth annual convention of the New Jersey State Dental Society a success, displaying at all times unselfish zeal and tireless labor in their behalf; therefore be it

RESOLVED, That the exhibitors do hereby tender to Dr. Gelston a vote of deep appreciation and thanks, together with the assurance of their continued best wishes and endorsement.

This is signed by forty-nine exhibitors.

On motion of Dr. LEONARD, the resolution was unanimously adopted by the convention.

Dr. GELSTON. Mr. President, I deeply appreciate the kindness embodied in this resolution, signed by the exhibitors of this convention. There is nothing that would repay me more than that. I hope that everything I do during the remainder of this convention will meet with the same reception, and that I shall have the same hearty co-operation that I have had in the past. I sincerely thank all who have had anything to do with this resolution.

On motion the convention adjourned until 8 o'clock.

THURSDAY—*Evening Session.*

President Albray called the meeting to order at 8.30 o'clock.

The PRESIDENT. We are very greatly favored this evening in having with us Dr. I. NORMAN BROOMELL of Philadelphia, Professor of Dental Anatomy and Clinical Dentistry, Philadelphia Dental College, who will read a paper entitled "Dentist or Stomatologist?"

[This paper is printed in full at page 980 of the present issue of the DENTAL COSMOS.]

DISCUSSION.

Dr. W. T. Wyckoff, Philadelphia. I have been very much pleased with and impressed by Dr. Broomell's paper, and being one of the older men of the profession, I am carried back to the time when dentistry was only slightly recognized by the medical profession. In fact, I distinctly remember that upon the night of our graduating dinner a promient physician, a noted specialist in Philadelphia, made an address in which he said that he sincerely hoped the time was not far distant when the dental profession would be recognized as a branch or arm of the medical profession. At that time we had great trouble in getting the medical profession to recognize anything that was more than simply mechanical dental work, but by persistent effort on the part of such men as Dr. Broomell and other writers and lecturers in the field of dentistry, the medical and dental professions have awakened to the responsibility and the magnitude of this subject, and today the pendulum has begun to swing the other way. I was glad to see Dr. Broomell caution against its swinging too far, as I think we have become a little crazed on this subject of tooth infection. It has always existed, but in my dental education the principal "bugs" we knew of were bedbugs and potato-bugs. We have heard of infections, but of course it comes a little hard for us older men to take it up and think of those things in the light that they should be thought of. I agree that we should accept this broader sense. There is no doubt in my mind that we should be entitled to go farther than we really have in this matter of oral surgery, because the dentist is better prepared to handle these cases than many a physician, as he has opportunities to more closely observe them.

Dr. Chas. S. Hardy, Newark, N. J. Mr. President, I enjoyed listening to Dr. Broomell's paper very much indeed. I think his ideas are a step in the right direction, and I think that at the present time the medical profession is giving us a great deal of recognition. I think they all appreciate that dentistry today is a part of the medical profession, and I believe that as far as teeth are concerned we are a great factor in the conservation of the health of the people, and of great assistance to the medical men in many instances, in successfully diagnosing and treating conditions which they have formerly battled with and have failed to get results. I hope the time will come, as Dr. Broomell says, when we receive a degree such as D.S. or M.D.S. or some other degree that will put us on a differ-

ent basis. I think the dental profession should push this matter strenuously, as it would not only result in recognition to a greater extent by the public and put us on a higher plane in their estimation, but we would have a better standing with the medical profession as a whole if we had a degree signifying special knowledge of the closely allied dental and medical subjects.

Dr. R. H. Riethmueller, New York City. I was very much impressed with the essayist's paper and its intention, but I cannot help feeling that the question of importance for the dental profession is not so much a change in degree, but a change in the quality of work. Dentistry has branched out into so many specialties that it is practically impossible for a practitioner to be a past-master in all its phases, and each practitioner should strive to perfect himself in the work for which he is best adapted. Take, for instance, the specialty of oral surgery, in which special interest is being taken by a great many practitioners today—no doubt owing to the impetus of the wonderful work that is being done in connection with the war. But even before that time a great many men began to specialize in oral surgery, attracted by the possibility of higher fees.

The medical profession readily saw the tendency of modern dentistry toward specialization, and has fully given it its support and co-operation. A wonderful illustration of the work that is being performed by oral surgeons was given this audience last night by Dr. Aller. What a wonderful task the dentist is now performing in the restoration of human wrecks to a semblance of human appearance and the possibility to continue to live in comparative health and comfort! The war films which we are to see will give us even a clearer conception of the extent of the wonderful work that is done near and behind the firing line, especially by the French, which will not surprise us when we remember the name of Claude Martin, the "father" of "immediate prosthesis."

The dental profession may well be proud of the wonderful services that it is performing today, and when the annals of this world-war are written, dentistry will surely occupy a very prominent place therein.

Dr. Wm. G. Chase, Philadelphia. This question of stomatology, or the degree under which we work, is a question that has been agitated by the dental profession for a great many years. I can go back to the time (1885) when I was a student in the Philadelphia Dental College, where we treated lesions of the mouth and head under the supervision of Dr. James E. Garretson, whom the older men knew and loved. I know how this subject from one time to another has been brought up, and I agree with the previous speaker that it is not a question of changing the degree conferred upon a dentist, but it is a question of fitting ourselves and preparing ourselves to take the positions we should occupy. We talk about the degree of M.D. What does it mean? Doctor of Medicine. It does not take a man any longer to become proficient as a doctor of medicine than to become proficient in oral surgery or as a dentist. I tell young men to make this, our chosen profession, as illustrious and as great as that of the older profession. I hold an M.D. degree, but I do not put it after my name because I do not practice general medicine. D.D.S. is good enough for me. I think Dr. Broomell means to teach us to broaden ourselves.

Dr. Arthur Zentler, New York City. It seems to me that the essayist intended to make a distinction between "dentist" and "stomatologist," and that the point was to know whether the man who passes the D.D.S. examination must confine himself absolutely to the treating of teeth, as it has been in the past, or whether he may go beyond this limit and engage in the treatment of all the adjacent tissues of the oral cavity.

Possibly in the past years most men have done no more than treat teeth, and it is therefore a question, as has been said here, of their equipping themselves with the necessary knowledge to be able to do that which the degree which they receive implies, whether it be a D.D.S.

or an M.D., D.S., or what not. It means simply that they must realize that their field of treatment starts at the vermilion of the lips and ends at the pillars of the fauces, and that everything that happens in this territory is in the realm of the dentist. If it is necessary for the purpose of mastering the details that the present curriculum be extended, that should be done. If it is in any way thought best that the degree should be changed, that may be done; but this is immaterial—it is the knowledge that matters, and with the knowledge, the ability to obtain results that will warrant us in extending our practice to a wider field.

I believe that Dr. Broomell's intention was to convey the meaning that we ought to do more than we do now and have been doing in the past; that we are stomatologists besides being dentists, and this means that we should be able to treat all the infections or other pathologic conditions of the mouth.

Dr. O. E. Inglis, Philadelphia. The word "stomatologist" was coined by Dr. Stellwagen, who received a great deal of credit for originating the term. The Academy of Stomatology of Philadelphia, was named as it is on account of his coining that word, and some other societies took similar names. The gentlemen who have spoken have practically voiced all that I can say on this subject. Dr. Broomell evidently has made a plea for us to be thoroughly informed on all the conditions of the mouth and be prepared to treat all those conditions, and with that statement I do not know that there is anything more to be said. I think that if we have such knowledge today we then only have to consider whether we have the legal right to use it. In this connection I might say that on one occasion I was discussing the matter with Dr. Wayne W. Babcock of Philadelphia, and asked him how far he thought a dentist was justified in operating upon the different parts of the mouth. He said, "He is justified in going just as far as his true knowledge enables him to go without doing any injury to the patient." I do not see how we can desire a broader basis than that.

Dr. Broomell (closing the discussion). I have very little to add to what I have already said. My chief regret is that I fear I did not make myself quite clear in my attempt to cover the subject in general. However, I am gratified to note that the discussion has brought out some of the points which I neglected to include in the paper. Some reference has been made by one or two speakers regarding the degree to be conferred, and my words in reference to that were simply a suggestion without even an offer that we change our degree, but simply to conform to the idea that our field of action covered the entire mouth cavity rather than the teeth only. Dr. Riethmueller said what is needed is better training. That is quite true; we all need better training. No matter how well one is trained in college, he may be better trained. But the weakness lies in this—that the average graduate of a medical or dental school does not make a full use of the training he has had. I am quite sure this is true of dentistry. The average young man upon graduating feels that he must make money. Therefore he begins to fill teeth, extract teeth, make plates, etc., because he knows that by doing these things he will be repaid financially; and again, once starting along these lines it is very difficult for him to switch off and broaden out as has been suggested. I am just as guilty as anyone in this audience because I do not practice stomatology in the full acceptation of the term. I have never treated a sinus other than those originating from the teeth. I have never treated any of the general diseases of the mouth—so I am equally guilty with anyone else. Nevertheless that does not say that we should not make an attempt to broaden our field of activity. I was well pleased with the remarks made by Dr. Zentler, because he expressed my thought in connection with the subject. He told us that we should not confine ourselves to operations on the teeth and their immediate environment. We seem perfectly at home operating

directly on the teeth and treating the gingival margin, but when we get beyond this narrow zone we are apt to feel timid and show a lack of interest. I feel gratified in the hope that my treatment of the subject will bear some fruit.

It was moved, seconded and carried that a vote of thanks be tendered to Dr. Broomell and to all who took part in the discussion.

The convention adjourned until 8 o'clock Friday morning.

FRIDAY—*Morning Session.*

The PRESIDENT. The next business in order is the report of the Committee on the President's Address, Dr. Van Gieson, chairman.

Vice-president Wakeley then took the chair.

REPORT OF COMMITTEE ON PRESIDENT'S ADDRESS.

Dr. R. B. VAN GIESON. *Mr. Chairman and gentlemen,*—Your Committee appointed to consider the President's Address submits the following report:

The recommendations contained in the address are as follows:

Recommendation No. 1

That any member of a local society, or a member of the New Jersey State Dental Society who is not a member of a local society, whose dues are not paid by March 1st of any year be suspended from all privileges of the local, State, or National societies until January 1st of the following year, and unless the arrearage in dues and the next year's dues are paid by that date, he be automatically dropped from membership.

Recommendation No. 2.

That the names of all applicants for membership in local societies be referred to the secretary of the State Society before a candidate can be elected, so that the record of the applicant can be investigated and transmitted to the local society.

Recommendation No. 3.

That the incoming Legislative Committee make a strenuous effort to secure the passage of legislation exempting dentists from jury duty.

Recommendation No. 4.

That the Legislative Committee be instructed to have framed and enacted an amendment to our present dental law similar to the provision of the New York dental law, declaring it illegal to practice dentistry under a false or assumed name, or under the license or registration of another person of the same name, or under the name of a corporation, association, parlor, or trade name.

Recommendation No. 5.

That in view of the successful prosecution and conviction of illegal practitioners in the state during the past year it would be a timely and courteous action on the part of this society to extend a vote of appreciation to the State Board of Registration and Examination in Dentistry, and also to the Attorney-general for the generous amount of time devoted to this purpose.

Recommendation No. 6.

That the society specify that the terms of officers begin on the 1st day of September following their election.

Your committee recommends the adoption of the above recommendations.

Recommendation No. 7.

That the society discontinue the publication of the *New Jersey Dental Journal.*

Your committee recommends that this recommendation be not adopted, but that the matter be referred to the Board of Trustees, believing that the result of such action will prove satisfactory.

Recommendation No. 8.

That a committee be appointed to make the wording of certain parts of our present by-laws more explicit.

Your committee recommends the adoption of this recommendation.

R. B. VAN GIESON, *Chairman,*
W. F. BARRY,
S. B. GLEASON,
CHAS. FAUPEL,
J. I. WOOLVERTON,
Committee.

On motion the report of the committee was adopted.

Dr. HARDY. I move that the society extend a rising vote of thanks to Dr. Raymonde A. Albray for his services rendered in his work on the *Journal,* and as president of this society.

The motion was seconded and carried.

Dr. HOPKINS moved that the Board of Trustees be authorized to draw up amendments in accordance with the instructions as adopted by the society today.

The motion was seconded and carried.

The President resumed the chair.

Dr. HOPKINS. On the opening day of the meeting we were led in singing by Professor Fithian, and I move that a vote of thanks of the society be extended to Professor Fithian.

The motion was seconded and carried.

Dr. WOOLVERTON. I would like the society to extend a vote of thanks to the United States naval war station at Atlantic City; to Rev. Robert Arthur Elwood of Atlantic City; to Mr. Chas. Richard Williams, and to the essayists and others who have taken part in this convention, and I make that as a motion.

The motion was seconded and carried.

The PRESIDENT. Gentlemen, our business is unfinished. This room will be used for moving pictures until 4 o'clock. I will therefore declare a recess until that hour.

President Albray called the meeting to order at 4.30 P.M.

The PRESIDENT. The first business in order is the election of new members.

Secretary FORSYTH then presented applications for membership.

After disposal of these he read a letter which the society had instructed him to forward to Dr. Truex thanking him for his faithful support of the society, and congratulating him on having attended its annual convention for thirty-five years consecutively.

Dr. MANNING moved that this letter be sent to Dr. Truex, and embodied in the record of the proceedings. (Carried.)

The PRESIDENT. A few days ago, Lieutenant Davis of Plainfield, stationed at Camp Dix, asked me to submit a matter to the society in regard to making the Camp Dix dental infirmary more attractive. I have been there visiting the infirmary. They have everything they want and need to work with—chairs, cuspidors, switch-boards, compressed air, steel cabinets, in fact everything a dentist wants to work with—but the inside of the building is finished in rather a rough manner. It is to be a permanent building. Dr. Davis suggested making the place a little bit more attractive, saying that it could be done if the materials were furnished. They have the labor, and all they need is some paint and some pictures, or something of that kind, to make it more attractive inside. He asked me to present the matter before the society here, and if they are willing to do so, suggested that a committee be appointed to go down there and visit the infirmary, see what was necessary, and take action toward securing it.

Dr. IREDELL moved that such a committee be appointed by this society.

Dr. HARDY seconded the motion, and added the following as an amendment: That the amount of the expense shall not exceed seventy-five dollars.

The motion as amended was carried.

The PRESIDENT. I will appoint that committee later. Dr. Slade desires to submit a matter for your consideration.

Dr. SLADE. There was a little misunderstanding last year on this subject, and it may well be considered again, to determine the viewpoint of the society in regard to the men of our profession in our state who have given up their family, their home, and their practice, and entered into the service of the country. There is a principle of right and wrong, a matter of patriotism, that enters into it, as well as a matter of business. Laying aside the occasion of last year and considering the subject from the present moment, it would be advantageous to consider this.

The thought I have in mind is, first, that these men have given up their busi-

ness; and second, if they return, and happily some of them will return to their practice, it is as little as we can do to put them on their feet, so to speak, just as quickly as possible after their return. In order to do that without any advertising or unethical feature entering into it, it is my thought that it would be well to supervise the method of announcing their return and that the matter might be taken up by this society. My idea is that the society prepare two cards, the first to be used by the society, requesting the dentists in the state to make a list of the patients who have come to their practice who have formerly been patients of the man who has entered the service, and upon the return of the man from the service he be furnished with a list of the patients who have recently been cared for. The society would then prepare a card that would read something like this:

Dr. —— announces to the patient in the care of Dr. —— that Dr. —— has returned to the practice of dentistry in [such town] and on [such street] after being in the service of the country.

This is one card. The other one, to be used by the dentist himself, to be something like this:

Dr. —— has resumed practice at —— after being in the service of our country.

If the practice is such as warrants it, it will be returned very much quicker than by the dentist coming back and having to go through the slow process that he did originally to secure his patients. A great number of men in our profession would do this, even if we did not take action, but this must be done in a methodical manner, and the National Society may well take it up throughout the country.

I therefore move that this subject be considered at this time by the society, with the view to preparing cards, and that the matter be taken care of at the discretion of those to whom it may be referred.

Dr. Tuttle. I desire to second the motion. I have had several conversations with Dr. Slade on this subject, and from what I can gather, his object by the motion is to make it official. If done in that way it would be much better for all concerned.

Dr. Tuttle. I will add an amendment to my amendment to the effect that we instruct our delegate attending the National Convention to bring this matter up before that body.

The amendment to the amendment was seconded and carried; the amendment was carried, and the original motion, as amended, was unanimously carried.

President Albray. I will appoint on that committee Dr. Slade, Dr. Hardy, Dr. Hirsch, Dr. Clark, and Dr. Tuttle.

I will now call upon our newly elected president, Dr. Geo. W. Wakeley, to come forward to receive the gavel. Before I present it to him I want to say that I thank everybody who has worked with me to make this convention a success. We appreciate the efforts which all the members of the society have made, together with everyone who has had anything to do with the convention. I trust you will all give Dr. Wakeley the same co-operation.

President Wakeley. I appreciate very much the honor you have bestowed upon me, and I will try during the next year to do everything I can for the best interests of the society.

Committee on Code of Ethics.

The report of this committee was presented by Dr. Van Gieson, chairman, as follows:

The committee investigated the Hanrahan matter, and considered it of sufficient importance to recommend that it be referred to the Board of Trustees for their action.

R. B. Van Gieson,
C. F. A. Hané,
R. A. Albray,
Joseph C. Halsey,
G. L. D. Tompkins,
J. W. Curtis,
Committee.

The convention adjourned *sine die.*

Virginia State Dental Association.

Forty-ninth Annual Session, held at Roanoke, Va., April 29 and 30, and May 1, 1918.

THE forty-ninth annual session of the Virginia State Dental Association was held in the Hotel Roanoke, Roanoke, Va., on April 29 and 30, and May 1, 1918.

MONDAY—*Morning Session.*

The meeting was called to order Monday, April 29, 1918, at 10 o'clock, by the president, Dr. W. H. Pearson of Norfolk.

Rev. W. H. VIRGIN, Roanoke, opened the meeting with prayer.

Hon. CHARLES M. BROWN, mayor of Roanoke, welcomed the association to Roanoke.

Dr. R. L. SIMPSON of Richmond made the response to the mayor's address of welcome.

Dr. PEARSON then read the President's Annual Address, as follows:

President's Address.

By Dr. W. H. PEARSON, Roanoke, Va.

Members of the Virginia State Dental Association, guests, and friends,—I wish to thank you for the honor in electing me to pilot this association this year, but I wish you to know that the smoothness with which it has been run is due to the faithfulness of those on the committees and the splendid manner in which the members have responded to every call. Again let me thank you.

Just forty-nine years ago there was a small group of men with a great vision, who recognized the importance of their profession and the need of organization for its development, and today this association stands as a monument to them. But let us ask ourselves the question, Is this monument a completed structure? And we are ready to answer with one accord, No.

In the horrible struggle that is raging in Europe the dentists have done a wonderful work in aiding the wounded. The surgeons realize that without the dentists their operation on the face is not a success. This has been a great impetus in bringing the profession to the attention of the world. Dentistry is beginning to come into her own, and the importance of this specialty of medicine is daily being better realized. What is most looked for, though, is preventive dentistry, and it behooves us as an association and as individuals to keep ourselves informed by study and to give all the assistance we can to the Research Institute, financially and otherwise, as it is through this institution we may hope to solve our scientific questions. The busy practitioner is not able to devote his time to these subjects, and had he the leisure he would not have the facility for doing the work; hence the more important it is for us to lend our influence in the most substantial way.

The movement for dental preparedness is one that merits our hearty support; the profession of our state, I am afraid, has not awakened to the importance of this subject. Let us arouse enthusiasm along this line, that each one of us may have a hand in doing his bit.

ORAL HYGIENE.

This is one of the most important subjects before our profession today.

I believe that last session there was an appropriation authorized by the associa-

tion for use of the committee, but on account of the unsettled condition of the country they have not seen fit to carry out the program as they had outlined.

It is important that this subject be taught in our public schools, and since the majority of the schools have phonographs, would it not be wise for us to get some records bearing a simple lecture on mouth hygiene and have them circulated through the state?

The motion picture is also a very effective manner of reaching the public. There is one thing that stands out very prominently, and that is, that we must formulate some plan by which we can reach the children of the state at the earliest possible moment in a systematic way.

RECOMMENDATION OF AN EXECUTIVE COUNCIL.

During our scientific sessions there is too much valuable time wasted with items of business that could be handled with much more dispatch, and many times with greater advantage to the profession, by a committee in advance of our annual meeting, and if necessary from time to time during the year the chairman could make his report to the association and action on the same be taken in a few minutes, thereby giving us more time for scientific work.

I recommend that an executive council be chosen, or that the membership of our Executive Committee be increased to eight or ten, and they be empowered to transact the business of the association.

Our meetings so far as the financial part is concerned are run in a very haphazard way. I do not wish to reflect on any who have had charge of the sessions in the past, for I realize that what has been done was, to the best of their knowledge, for the interest of our association and the profession at large. However, we should adopt a more businesslike method of handling the situation, and the committee and presiding officers should know what to count on. I recommend a budget system, and that the Executive Council or committee be empowered to put such a system in operation in the future.

POSTGRADUATE MEETINGS.

Next year will be the fiftieth anniversary, and let us celebrate by having a real postgraduate course. Our lectures from the celebrated men who meet with us each session without remuneration have given us some valuable theoretical training, but we are to a great degree neglecting the technical skill so essential for good dentists.

Now, in order to put this course in operation, it will mean that we must make a financial sacrifice. I believe it will require at least twenty dollars besides the regular dues of the association; however, this can be worked out by a committee. Oklahoma State Society is the most active body in the United States today, and they have had a very successful course this month. They have been the first to blaze the way, and while Virginia has neglected to take her lead we can be the next to follow.

I recommend that we hold our next session at the Virginia Medical College, Richmond, where we can get every facility for such a course, and that we be in session one week in spring or fall at such time as can be arranged.

In closing I wish to thank the essayists and clinicians for the sacrifice they have made in coming such long distances to help make our meeting a success. I trust you will feel well repaid, and we extend to you the privilege of the society and a hearty welcome to our state.

May I repeat in closing that we are delighted to have you with us?

The following were appointed as a committee to consider the President's Address—Drs. W. H. Street, Richmond, Wm. Pilcher, Petersburg, and J. P. Stiff, Fredericksburg.

Dr. Pearson then called attention to the fact that the payment of dues was in order at this time, and stated that the treasurer, Dr. W. M. Sturgis of Marshall, was ready to receive dues.

Dr. STURGIS explained that the dues of the society were five dollars, two dollars of which were sent to the National Dental Association as dues and for the *Journal,* and one dollar to the National Research Institute. He further explained that membership in the National Association ran for the calendar year; so that if the dues were not sent until November, the membership in that body would expire on December 31st. The person would retain membership in the state association after that time, but would not be a member of the National. To correct this, he suggested that instead of paying dues at the annual meeting, the members of the Virginia Association pay their dues in January. This would save a great deal of trouble, and would insure each member's receiving the *Journal* of the National Dental Association, which he considered most valuable.

After the transaction of some minor business,

Dr. PEARSON called for the reports of committees.

Dr. HARRY BEAR reported for the Oral Hygiene Committee, in the absence of its chairman, Dr. Guy R. Harrison of Richmond, who was in the United States Medical Service, having been called away to camp too suddenly to prepare his report. Dr. Harrison had asked Dr. Bear to extend his greetings to the members, and to report that the committee had decided that the money appropriated at the last meeting could not be spent this year, owing to pressure of circumstances and unusual conditions prevailing. As much as possible, however, had been done through the State Board of Health, of which Dr. Harrison is a member. He had got the field men to canvass the different sections of the state, and had equipped each with a set of slides and a set of charts showing various mouth conditions. Dr. Harrison and others had also been lecturing through the School of Social Economy and the Visiting Nurse Association. As much as possible had thus been done in the field of Oral Hygiene.

Dr. J. M. LEWIS of Richmond, a member of the Dental Legislative Committee, called attention to the case of a retired practitioner who proposed to act in contravention of the law, and who had been notified on behalf of the committee that he would be opposed.

Dr. M. B. RUDD moved that a vote of thanks be given to Dr. Lewis and Dr. Hoggan.

The motion was seconded and carried.

Dr. STIFF made a motion that in future no clinician be allowed to come to the state without the approval of the president of the association.

Dr. J. E. APPLEWHITE of Newport News, seconded the motion as Dr. Stiff had made it, but suggested that this be done with the approval of the Executive Committee, instead of the president.

Dr. HARRY BEAR said that the president was usually the spokesman for the association, and suggested that it would be better to make it "the President and Legislative Committee."

The motion as amended was seconded and carried.

Dr. R. H. WALKER, Norfolk, chairman of the Clinic Committee, asked whether the members would rather have the clinics held in the progressive order or not. He explained the relative advantages and disadvantages of each method.

It was moved and seconded that the clinics be progressive. After a short discussion, during which the President referred to the successful progressive clinic held at Norfolk in the preceding year, the motion was carried.

The association adjourned at 11.45 o'clock.

MONDAY—*Afternoon Session.*

The meeting was called to order by the president, Dr. Pearson, at 2.45 o'clock.

He then introduced Dr. FREDERICK BOGUE NOYES of Chicago, Ill., who de-

livered a lecture on the subject of "The Pulp and Peridental Membrane."

[This lecture is not published for the reason that no revised manuscript was received from the lecturer.—Ed.]

Dr. W. H. Street of Richmond, suggested that as there was nothing scheduled for the evening, a patriotic meeting might be held, and asked that a committee be appointed to arrange for it.

Dr. Pearson appointed on this committee Drs. Street, Rudd, and Stiff.

An Illustrated Talk on the Work of the Preparedness League was then given by Dr. J. A. C. Hoggan of Richmond.

Dr. W. M. Sturgis made a motion that during the continuance of the war those members who had volunteered or been drafted and had gone into active army service be relieved of the necessity of paying their dues to the association.

The motion was seconded and carried.

Adjourned at 5.30 o'clock.

Patriotic Meeting.

A stirring patriotic meeting was held in the evening, lasting from 9 until 10.45.

The principal speaker was Dr. T. B. Hill, who had been in Corea for a number of years as a missionary, and was then home on sick leave, and had been taking an active part in war work.

Other addresses by members of the association followed, at the close of which it was announced that $3750 had been subscribed for Liberty bonds.

Dr. Hill then closed the meeting with prayer.

Tuesday—*Morning Session.*

The meeting was called to order at 10.15 o'clock, the president, Dr. Pearson, in the chair.

Dr. Pearson introduced Dr. Stephen P. Mallett of Boston, who presented a paper entitled "Procain for Dental Operations."

[This paper is printed in full at page 966 of the present issue of the Dental Cosmos.]

DISCUSSION.

Dr. J. M. Lewis, Richmond. There are just a few questions I should like to ask about this method and some of the suggestions Dr. Mallett makes. I have used some of this anesthetic, and have had pretty good success. I notice that he says that procain is seven and one-half times less toxic than cocain. Are these conclusions not drawn from experimental work on animals, and was it not brought out and proved at the National meeting in New York that in human beings it is many times less toxic than that? In fact, I have never read an authentic report of a death from the use of procain, although there may have been some such deaths.

Dr. Mallett mentioned limiting the suprarenin content of the injection. I think the most universal success the men who are trying it have had has been with the F and E tablet combination. The E tablet alone produces too great an anemia, but with the E and F combination, we get an ideal combination and bleeding enough for the blood-clot to be formed, with no danger of "dry socket" after extraction.

Then he mentioned absolute alcohol in sterilization. I wonder whether he has had any trouble from precipitation from the metal part of his syringe in absolute alcohol, and has used glycerin to prevent it. This necessitates boiling before using; but then, personally, I always like to boil my syringe, solution cup and solutions. This does away with any chance of injection of alcohol along with the solution. Temporary paralysis of the nerve is sometimes caused by such an accident.

Then I want Dr. Mallett to speak of the advantages of Ringer's solution as against plain normal salt solution.

There is another thing that I should like to ask. I see that he mentions the untoward effect of the suprarenin content. The time of injection will control that somewhat. If in deep anesthesia

at least a minute is taken to make the injection of the solution, one will get less of that feeling of oppression and trembling in the extremities that Dr. Mallett mentions.

Then he speaks of sterilization of the field of injection, and also the pain from the needle. Dr. Riethmüller suggested, for the sterilization and anesthesia of the field of injection, a saturated solution of menthol in benzol added to equal parts of iodin and aconite. Refrigeration gives a temporary local anesthesia, and does away with the pain of the needle and the necessity of using nitrous oxid and oxygen.

I have had some untoward effects in this method of anesthesia. The worst was a hematoma from injection. This, however, took care of itself, and these minor accidents need not cause uneasiness if you have done a sterile operation.

The after-pain in ordinary cases I do not consider, because it is from the wound, and can very readily be controlled.

Dr. Mallett speaks of fainting. I have never had that occur. I wonder whether it could have been caused by the effect of too great adrenalin content on brain circulation, and shall be glad if the doctor will take up this question.

Dr. Mallett. In regard to procain being seven times less toxic than cocain, I will say that this has been ascertained by experiments on animals. I do not believe that anyone has experimented on human beings in that respect. It is something that will have to be determined in the future. It certainly seems to me to be seven times less toxic.

Dr. Lewis. I mean that in clinical cases it is even less toxic than seven times. Has there been a recorded death from novocain?

Dr. Mallett. I have not heard of any, and if there were, I feel certain that it is not the fault of procain. I have studied the drug, and know that it is reliable and safe if carefully used. It keeps, it boils, and can be used in larger quantities than cocain. I sometimes think that it is not as strong an anesthetic as cocain in the form of tablets used for pressure anesthesia, as it does not seem to take effect as readily. I think there are cases in which we should limit the amount of suprarenin, particularly in anemic people. These are cases that have to be determined by careful study, observation, and by considering and inquiring into the past history of the individual. A keen, experienced mind can quickly determine the dosage of procain and suprarenin. There are a few cases in which I have refused to inject procain, prefering some other anesthetic, but it is very seldom necessary. I do not think much of the use of glycerin, because it makes such a gummy solution with the alcohol, and it is difficult to keep the instruments what I call clean. I did use glycerin for about six months and gave it a fair trial, but have eliminated it entirely. I do not know of any better way than to sterilize the syringe by boiling, being careful to bring it slowly to a boil, beginning with cold water, and after allowing it to cool slowly, wipe in sterile oil and place in absolute alcohol. I do not think there is any advantage in the use of Ringer's solution. I have used Ringer's solution, and will say that I personally prefer normal salt solution, as I have had perfect results with it, and consider the added medicines in the Ringer solution unnecessary.

I think one should be careful in injecting, particularly on the palatal side of the jaw. The injection should be made much more slowly than on the buccal. The buccal injection may be made quite quickly, at least as fast as the tissues will take up the solution, and in the "puffing" method the injection is quite fast. In conduction anesthesia we have heard many men suggest the movement of the syringe back and forth, to avoid injecting into a vein, and although I think there is no objection to it, yet I consider it unnecessary if one has the mouth wide open and the field of operation well exposed. With a positive understanding of the anatomy of the parts, the straight, moderately slow injection is best. I think very often there is too much time taken, thereby causing un-

easiness of the patient and liability to break the needle.

I have not used anything but iodin, iodin and aconite, or campho-phénique as a sterilizing agent on the field of operation.

Canker spots often occur at the point of injection. As a rule I warn patients that they are likely to have sore spots, and should keep the mouth as clean as possible and visit me the next day. I advise the use of Dobell's solution or some antiseptic mouthwash. I have seen some severe cases of inflammation at the point of injection. I consider fainting caused by cerebral anemia untraceable.

Dr. Lewis. Have you had it much where you used a strong suprarenin solution?

Dr. Mallett. Yes, I have had such trouble where I used too much adrenalin or suprarenin. Some years ago I used E tablets entirely and experienced considerable trouble. I think that the E and F tablets should be used in combination, even in cases of extensive operations, and prefer to use more of such a solution than to use the E tablets alone.

Dr. F. R. Talley, Petersburg. I want to make a suggestion. Dr. Lewis said glycerin gums the investment and is hard to get off. I overcome that by having on my table an ordinary round holder of glass arranged on the side of the wall. I have a shaker such as is used in soda fountains in making milk shakes. The syringe is made of thin glass. I have a heater for boiling water. Putting the syringe down in boiling water dissolves the glycerin and alcohol. I have used the same syringe for eighteen months, and have never broken it. By using this apparatus you have perfect radiation, and the glycerin and alcohol can be removed by boiling.

Dr. Mallett. Glass barrels with plungers are very difficult to obtain. In my opinion, the Fischer syringe is the best, and extreme care must be taken when it is boiled, bringing the water slowly to a boil and allowing it to cool slowly, otherwise the glass barrel is easily broken. Therefore it is in my opinion better not to boil or place the syringe in hot water but once a day for ordinary work. Seventy per cent. alcohol is the best sterilizing agent, but if one uses extreme care to always leave a little solution in the syringe after injecting, then after expelling the remainder of the solution and removing the needle, the syringe can be rinsed in sterile distilled water and placed in absolute alcohol. In this way we avoid the use of glycerin and other gummy agents, and obtain perfectly satisfactory results. Glycerin is all right, but unnecessary.

Dr. Talley. It does not corrode so much.

Dr. Mallett. It is all right, but I get more satisfactory results with plain alcohol, and do not like the feeling of the glycerin.

There is a combination of three drugs that I have found very efficient as a dressing agent after oral surgical operations, particularly after impactions, root amputations, etc., which I would like to suggest that you give a fair trial, and let me know what you think of it. The preparation is as follows: Equal parts of chloroform, liquid petrolatum, and guaiacol, with as much powdered iodoform added as to suit the individual. It is preferable to use the iodoform gauze, saturating it in the solution, and then absorbing the excess of what one thinks is sufficient for the particular case under treatment. I have found that the patients have comfort, are free from after-pain, and infection is prevented by the use of this solution.

The President thanked Dr. Mallett for coming to the meeting and reading his paper.

Dr. W. H. Street of Richmond, chairman of the Committee on the President's Address, read the report of the committee, which was as follows:

Report of Committee on President's Address.

We, your Committee on the President's Address, respectfully commend his recommendations with regard to the subject of oral

hygiene, and further suggest that the Committee on Oral Hygiene be particularly and carefully selected to secure those interested in the subject who will give their time and attention to the matter throughout the year, realizing that there is nothing of greater importance to our profession today.

We recommend the appointment of this committee at once, in order that a meeting may be had and plans formulated while this association is in session.

With reference to the second point in our honorable President's address, we concur with him that too much time should not be consumed in detail; such should be handled by the committees, but nothing should be done to discourage free discussion and debate on all subjects.

We do not think there should be any change in the plan of the election of the Executive Committee at this time, or that the number of the committee should be increased.

We recommend, however, that a committee be appointed to be known as the Supreme Council, composed of five members, one member to retire each year, the new member to be appointed by the president. We feel that the Council should be men of experience, deeply interested and enthusiastic, who shall have in heart and head the affairs of the association throughout the year and from year to year. That they should keep in touch with all matters of the association, and be an advisory body to the entire membership. Such committee shall in no way interfere with any of the committees, but shall be to them both soul and Council.

We enthusiastically recommend that part of the address dealing with a postgraduate course, and suggest that a committee be appointed to work out the details so far as possible and report at this session.

In conclusion, your committee commends the able address of our president, and appreciates the unselfish work he has consistently done for the welfare of the Virginia State Dental Association.

Respectfully submitted,

W. H. Street,
Wm. Pilcher,
J. P. Stiff,
Committee.

It was moved and seconded that the report be adopted. After some discussion as to whether the committee of members in the different districts of the state, as recommended in the report, should be appointed by Dr. Pearson or by the incoming president, the motion to adopt the report of the Committee on President's Address was carried.

Dr. Pearson explained his idea as to what the postgraduate course at the next meeting of the association should be. He thought that there should be several good men to give it, the number depending on how many intended to take the course. It would cost a good deal more than the small fee paid in the association. His idea was that each member should signify which of the several courses he wished to take. If there were four of these, they could be given for four consecutive years, so that each man might have an opportunity to take each course.

Dr. Pearson appointed Dr. J. A. C. Hoggan, Richmond, Dr. M. B. Rudd of Richmond, and Dr. C. B. Gifford of Norfolk, as members of this committee, with instructions to report at the evening session.

As members of the Oral Hygiene Committee, the President appointed Drs. R. D. Phelps, Lynchburg; J. E. Applewhite, Newport News; H. L. Smith, Charlottesville; C. A. Newland, Wytheville; W. H. Street, Richmond; F. V. Clark, Roanoke; W. H. Savage, Clifton Forge, and J. M. Lewis, Richmond.

Dr. Hoggan moved that the duties of the Council be defined and incorporated in the by-laws.

The motion was seconded.

Dr. Talley offered as an amendment that the report of the committee be adopted. Dr. Hoggan accepted the amendment.

The amended motion was then carried.

Dr. W. M. Sturgis presented the Report of the Treasurer.

On motion, duly seconded, the Treasurer's Report was received and filed.

The Secretary announced that at the Patriotic Rally, held the preceding evening, thirty-one subscriptions had been received, amounting to $4050.

Dr. Street made a motion that the association invest $300 in Liberty bonds.

The motion was seconded and carried.

Dr. STREET then made a short address in which he asked for additional subscriptions to bring the amount up to $5000, it then being $4350.

Dr. B. T. BLACKWELL presented the report of the Executive Committee.

On motion, the report was adopted.

Dr. WALKER nominated Dr. Campbell and Dr. Stiff to be recommended to the Governor as members of the Board of Examiners.

Drs. Walker and Potter were also nominated. The nomination was seconded.

It was moved and seconded that the nominations be closed. The motion was carried, and they were chosen.

Dr. STREET announced that the $5000 subscription to the Liberty loan had been secured. (Applause.)

Adjourned at 2 P.M.

TUESDAY—*Evening Session.*

The meeting was called to order by Dr. Pearson at 8.30 o'clock.

Dr. E. U. POTTER of Roanoke, read the report of the Board of Examiners.

There being no objections, the report was accepted.

The scientific program was then taken up, and Dr. SAMUEL P. CAMERON of Girard College, Philadelphia, Pa., presented a paper entitled "The Value of Weak Solutions of Formalin for Immediate Root Sterilization."

Dr. HARRY BEAR of Richmond, read a paper on the "Scope of Exodontia."

The association proceeded to the election of new members, and the President appointed as tellers Drs. Sturgis, Street, and C. E. Harper of Danville.

Dr. BLACKWELL read the list of candidates approved by the Executive Committee, and all the candidates were duly elected.

ELECTION OF OFFICERS.

The next order of business was the election of officers for the ensuing year, which resulted as follows:

President—Dr. S. B. Ward, Bellehaven.

Vice-president—Dr. B. T. Blackwell, Richmond.

Treasurer—Dr. W. M. Sturgis, Marshall.

Recording Secretary—Dr. Geo. F. Keesee, Richmond.

Assistant Recording Secretary—Dr. Harry Bear, Richmond.

Corresponding Secretary—Dr. W. H. Street, Richmond.

In regard to the Executive Committee Dr. D. R. PHELPS of Lynchburg made a motion that the constitution be changed in such a way that the chairman would be dropped each year, and a new man elected, the second on the list for the preceding year becoming the chairman for the ensuing year, and each member of the committee moving up one place.

The motion was seconded and carried by a rising vote.

It was decided that the society could not act under this amendment until the following year, however, and that three members of the Executive Committee would have to be elected on this occasion.

J. A. C. Hoggan of Richmond was nominated and elected as chairman. The following were nominated and elected as the other members of the committee: Dr. C. W. Beauchamp of Charlottesville, and Dr. W. G. Delp of Rural Retreat.

Dr. J. A. C. HOGGAN made a motion that a committee be appointed to divide the state into specific districts, to represent component societies, and have a president of each society, so that it may form a working organization for the accomplishment of matters that concern the dental profession.

The motion was seconded and carried.

On motion, duly seconded, a vote of

thanks was given to the official stenographer, Miss Lulu Gay of Philadelphia.

A motion was carried to appoint a committee to draw up resolutions concerning the death of Dr. J. B. Pressey of Hampton, and the President appointed Dr. Campbell as chairman, with power to ask two other members to assist him.

The SECRETARY made a motion that the association authorize the treasurer to buy three Liberty bonds with the three hundred dollars voted for this purpose, and be the custodian of these.

The motion was seconded and carried.

Dr. PEARSON said that he would appoint the secretary as a committee of one to attend to the matter.

Dr. PEARSON then presented to the society the newly-elected president, Dr. S. B. Ward, who expressed his appreciation of the honor conferred upon him.

The association then adjourned.

Mississippi Dental Association.

Forty-third Annual Meeting, Meridian, Miss., April 16 and 17, 1918.

TUESDAY—*Morning Session.*

The forty-third annual meeting of the Mississippi Dental Association was called to order at 9.30 A.M., Tuesday, April 16, 1918, by the president, Dr. T. B. Wright of Hattiesburg, in the Great Southern Hotel, Meridian.

The meeting was opened with prayer by Dr. DEB. WADDELL.

The Hon. J. M. DABNEY, mayor of Meridian, gave the welcome address, which was responded to by Dr. A. B. KELLY of Yazoo City.

Dr. M. B. Varnado, vice-president, in the chair, introduced Dr. T. B. WRIGHT, the president, of Hattiesburg, who then read the annual address, as follows:

President's Address.

By T. B. WRIGHT, D.D.S., Hattiesburg, Miss.

Fellow-members of the Mississippi Dental Association, ladies and gentlemen,—I am gratified to see so many present, and welcome you most cordially to this the forty-third annual session of the Mississippi Dental Association. Our "destiny" is "onward," and this being true, it means that our efforts must be united for every good work.

We meet today in Meridian, the Queen City of our state. It is not our first visit to this city, and it affords us a peculiar delight to be here again, to exchange greetings with those to whose generous hospitality we are not strangers, and with whose good-will we have before been signally honored. We have the most pleasing surroundings, with every facility for our meeting, and a program filled with clinics and ideas from the very best men in our profession. These we hope may all tend to inspire those in attendance so that this meeting shall become a memorable one.

Among the vicissitudes incident to life no event could have filled me with deeper appreciation than the preferment so generously conferred upon me by my asso-

ciate members at the last session of this body, and I would be remiss indeed on this occasion did I not extend to you my grateful acknowledgment of the honor which it seemed your pleasure to bestow upon me. Especially do I wish to express my deep sense of obligation to the Executive Committee, the officers, and the various committees of the society for the faithful work done in arranging for this meeting.

It is not my purpose to enter into a lengthy discussion, but it has been my ambition to make some real contribution to the association, and I have tried to make some study of the problems which are before us, and which must be solved by those who come together in meetings of this kind. So, realizing the responsibility resting upon the presiding officer, and being as I am deeply concerned regarding our profession at large, and our own state organization in particular, I wish to call to mind a few thoughts for your careful consideration.

MEMBERSHIP OF THE SOCIETY.

It is gratifying to note the work done by our Membership Committee. They have put forth earnest effort and have done well. Yet we are struggling on with a membership of less than one hundred and fifty when there are many more efficient, ethical dentists in our state who should be working with us, and who should be made to realize that they should be contributors to our meetings, and that by attending they would, no doubt, receive many good ideas. It should be our aim and determination to make every dentist of good standing recognize that there are real benefits to be derived from meeting each year with his state association.

I am sure I voice the mind of many, yea, all present, when I appeal for some plan to be submitted whereby we may largely increase our membership. There are many demands being made upon our profession today; we are making wonderful strides forward, difficult problems will be met, and we must prove ourselves fully abreast of progress in all lines. It behooves us, then, to arouse ourselves to the realization of this greater responsibility that is being placed upon us, and of which we are proud. I am convinced that we shall prove ourselves equal to the task, for we know we must be "up and doing" in the very best service we can render our fellow man. We must cooperate, we must preach the doctrine of progress and good-will among our fellows, and bring them into vital sympathy with our organization, and get their help.

A body or an organization of this nature never stands still; it either progresses or retrogresses. It is not necessary to ask what the trend of this membership will be, for there is no reason why we should not move forward and enlarge, and become one of the best state dental societies of the country.

ETHICS.

It is the duty as well as the desire of the members of this organization to feel and to make known that we hold to the maintenance of *ethical dentistry*. We stand for fair dealing with the public, yet as we press forward in our professional career, struggling hard to gain firmer foothold as we march onward, we are reminded that there are always some disagreeable tasks, not only in our daily practice, but along the route, as we meet those in our own vocation who are not willing to compete fairly with their brother practitioners, but humiliate the profession and violate its ethics which mean so much. I refer to the flagrant advertisers. They know better, but wilfully choose this course, and it is an injustice to the dental profession, and ofttimes an imposition upon the public. They need to be shown the error of their way. It will require delicate study, of course, to determine the means by which we may influence these men against such acts, and induce them to join with us in upholding our profession to its true standard, rather than to debar them be-

cause of their lack of regard for ethics. Any vocation is better for its ethics—code or codes if you please. Let us now strive to correct this evil, and go about it in such a way as to obtain results. Let us put forth concerted effort to win these men to a real appreciation of the genuineness of the *ethical dental profession.*

At this point I would suggest that a committee be appointed by the incoming president to prepare and read a paper to the medical profession at the next annual meeting of their association, accompanied by a copy of our national code of dental ethics, which has been adopted by this society. Impress upon them that we are striving to work hand-in-hand with them, and endeavoring to maintain our vocation upon the same high plane with their own noble profession, of which we are indeed a branch, a specialty, and that we deserve and should have sympathy and co-operation from them. Each year these two professions are becoming more and more closely allied. It has been said that the next step in preventive medicine must come from dentistry. It is a well-known fact that scientists have all along, but more recently, traced the cause of many diseases and ills to the condition of the mouth and teeth; therefore our professions should work together in mutual interest and understanding. Let the medical profession realize that we stand for genuine, ethical, conscientious service and the best good to humanity.

It is known that many mental disorders are traceable to neglect of the oral cavity. This is an acknowledged fact, and yet I say, and it is with shame I acknowledge it, that our poor unfortunates housed within our insane hospitals, for whom our state stands guardian, have no regular dental services. Should not the state employ a dentist to relieve their suffering? Is he not a necessity? Our insane hospitals as well as other eleemosynary institutions should have efficient and conscientious dentists on their professional staffs. I would suggest that our Legislative Committee emphasize this fact strongly in their recommendations to the Legislature, and insist that it be given attention at the next session.

PUBLICATION OF THE PROCEEDINGS OF THE SOCIETY.

Each year we expend from $150 to $200 for the preparation and publication of our proceedings in pamphlet form. It has occurred to me that we might well discontinue this expenditure. I have been in correspondence recently with the editor of the DENTAL COSMOS, and he assures me that he is not only willing to have our proceedings, in the main, appear in the COSMOS, but will be glad to sustain the cost of making the report. In this way we could still have our minutes, and the fund heretofore used for this purpose could be placed in the treasury subject to call for greater benefit to our organization. In a short time this fund would accumulate, and enable us, as we have often wished, now and then to have men of national reputation come before us in a series of lectures or clinics. This would be a schooling to us, and I firmly believe would be a means of increasing our membership.

I would recommend that hereafter we make our sessions longer during the day, and eliminate the night sessions. This will afford us, after a day of hard study, work, and discussion, time for recreation, good-fellowship, and rest. We would then return to the convention hall the next morning refreshed, with minds wide awake and energies alert to derive the most benefit from each clinic and paper read. The Program Committee could keep this in mind in arranging the program. Larger organizations have successfully handled their programs in day sessions. I believe we would welcome the change, and after trying it once, adopt it permanently.

ARMY DENTAL LEGISLATION.

I would feel that I had not done my full duty were I to close this address

without giving voice to the appreciation we feel toward our National Congress for the recognition given the profession of dentistry. Of course we are all familiar with the act passed by Congress October 6, 1917, wherein it is enacted that the dental corps of the regular army shall consist of commissioned officers, with rank, promotion, etc., on the same basis as now exists or may be provided hereafter for the medical corps. Of this recognition we feel appreciative, as we have long realized it is a justice due us. Knowing and studying, practicing, and coming in contact, as we do many times each day, with the advantages to be gained in health from a mouth and teeth well kept and in perfect condition, we could not expect less of our lawmakers.

When on April 6, 1917, in an extra session, Congress declared that a state of war existed between the United States and the Imperial German Government, authority was given our President, commander-in-chief of the army and navy, to use all his power toward preparing a defense against imperialism. Our worthy President felt that in order to carry on the war successfully it was necessary that all our forces, professional, business, and men from every vocation, be called to service.

The strength of an army is its man power, and as someone has said, "No man is stronger than his teeth," since his health depends to a large extent upon the condition of his teeth. The dental profession, indeed, forms one of the greatest resources for making our army efficient. There are many dentists in the service. Many were in the regular army, and there are many who have enlisted since war was declared; many are working in cantonments now, and still there is need for more—just as there comes the call for more medical men, more nurses, and more fighting men. We can not all go to the battle-front, but we can all do our bit. There are liberty bonds to be purchased, thrift stamps in abundance; our obligation to protect the practices of our fellow practitioners who have gone, opportunity to join the Preparedness League of American Dentists—something for all of us to do in the service.

We are at war! it is *our war*. Mr. Wilson asks that our every resource for winning the war be utilized. There is every reason for us to face this problem seriously, and to be unflinching in our determination to solve it aright. We need not fear the future. Why should we? is there any good reason? We are blessed in that the rivers of blood are not flowing in our own land. While we stand on this side of the broad Atlantic and look in one direction we see abundance smiling upon the fields, with all the blessings earth can afford; the sun rises each morning to give brightness, and shed its light upon all habitations. So far as battle is concerned all is quiet, a picture of peace!—while if we turn a listening ear in the other direction we can almost hear the thunder of cannon and wails of suffering. Could we but see afar our eyes would rest upon harrowing sights, hunger, devastation, and death—a picture of war, relentless, cruel, manacled with horrors. It is ours to *give*, to *send*, to *go*. We know that the man nearest perfect is he who gives himself to the activity of the most noble impulses of his mind and soul, who employs his best efforts for good—the one who throws himself into the midst of work for humanity, forgetful of self, and thoughtful only of what the reaction of his beneficence will mean to the world. This is where our profession can prove its most earnest and highest motive. We are not slackers; it is not time for these, nor "hagglers," nor critics, but we are men bound by honor and our own impulses to join for the right. Upon the one hand stands the Kaiser and everything representative of monarchy and hatred; upon the other hand, the United States and her allies, in order that the world may have liberty. 'Tis easy to make our choice, for

> We are set where the ways are met
> To lead the waiting nation on;
> Not for our own land is Freedom's
> flag unfurled,
> But for the world.

The Chair appointed Dr. J. N. C. Moffat, Dr. C. A. Roy, and Dr. G. F. Haynes as the Committee to report on the President's Address. The report was as follows:

Report of Committee on President's Address.

We, the Committee on the President's Address, beg leave to submit the following report:

First: We consider this address a splendid appeal to the nobler qualities of manhood, and a just tribute to the patriotic spirit so unanimously evinced by the membership of our profession.

Second: The suggestion that we renew our efforts to enlarge our membership is certainly a timely one, as our secretary's books show an actual loss in membership, but as no specific plan was offered, we leave the question open for discussion.

Third: With reference to the "flagrant advertiser," as no means has ever been found to reach these men as a class, we feel that it would be a waste of time to take up the question in open session, although we feel that each community should be encouraged to use every effort possible to combat this evil.

Fourth: The suggestion that we authorize the appointment of a committee to prepare a paper to be read at the meeting of the Medical Association, together with our code of ethics, meets with our approval, and we recommend its adoption.

Fifth: We favor the suggestion that our Legislative Committee ask for an act providing a dentist on the staff of our Insane Hospital.

Sixth: With reference to the suggestion of discontinuing the practice of printing the Proceedings of the association in pamphlet form, we find, after reading some of the correspondence between our president and the officials of other state organizations, together with that of the Editor of the Dental Cosmos, that the idea appeals to us very strongly.

Seventh: The recommendation for daylight meetings really meets with our approval, when possible to so arrange them, but we doubt the wisdom of making any official changes along that line. Therefore we do not recommend its adoption.

Eighth: We approve the voice of appreciation to our National Congress for what was done in our behalf, and recommend that a vote of thanks and continued allegiance to the "greatest nation on earth, the U. S. A.," be spread on our minutes.

Respectfully submitted,

G. F. Haynes,
J. N. C. Moffat,
C. A. Roy,
Committee.

It was then moved and seconded that the report be received and spread on the minutes.

It was moved and seconded that the President's address as reported by the committee be discussed.

Dr. Clemmons of Meridian discussed the pamphlet form of proceedings and also the night session. He advocated that the proceedings should be published as formerly.

Dr. Smith discussed the question of dental services to the Insane Asylum.

Dr. W. R. Wright moved that the incoming secretary and treasurer be instructed to furnish the proceedings to the Dental Cosmos, a copy to be kept for the archives at Jackson. (Motion carried.)

Dr. Kelly moved that the first three articles of the President's address be adopted as read. (Motion carried.)

Dr. Kelly moved that the fourth clause in the President's address be adopted. (Motion carried.)

Dr. Kelly moved that where other state institutions have physicians, we ask that a dentist be added. (Motion carried.)

The question was referred to the Legislative Committee.

The seventh article, in regard to night sessions, the committee moved be not adopted. (Motion carried.)

The eighth article was on motion adopted.

Dr. Wright, in the chair, extended a cordial greeting to visiting dentists.

Dr. W. R. Wright of Jackson moved, in the case of members who have offered their services to the nation, or who may offer them, that their dues be remitted. Referred to the Board of Trustees.

The next order of business was reports of committees.

Dr. BRUNSON, chairman of the Executive Committee, reported that Dr. Kelman and Dr. Phillips would not be in attendance.

Dr. BEAVERS, chairman of the Clinic Committee, announced that the clinics would begin promptly at 2 o'clock Tuesday afternoon.

Report from the Clinic Committee was made by Dr. REABAN.

Dr. L. A. SMITH reported for the Honorable Fellowship Committee.

Dr. HAYNES reported as delegate to the National Dental Association.

The association then adjourned to meet at 2 P.M.

BOARD OF TRUSTEES.

First Meeting.

Called to order by the chairman.

The following members were present: Dr. C. B. Baker, J. N. C. Moffat, J. F. Brunson, W. R. Wright, A. B. Kelly, W. C. Dennis, L. B. Price.

The Secretary read a letter from Dr. J. F. Colley of Moss Point, asking membership.

The applications of Dr. W. H. Ellis, Midnight; Dr. T. C. Chicester, Lambert; L. R. Butler, Cleveland; Willard F. Powers, Greeneville; W. B. Brady, Lexington; Carlton Kelly, Marigold; J. S. McWilliams, Yazoo City; E. C. Shackelford, Louise; T. K. Barfield, Meridian; Ira W. Williamson, Hickory, reinstatement, were received, and all being properly indorsed were elected members.

Dr. W. R. WRIGHT moved that the members who had enlisted or would enlist in the military service be exempted from dues. (Motion carried.)

Next meeting of Trustees called for Wednesday at 8 A.M.

TUESDAY—*Afternoon Session.*

The afternoon session was devoted to the following clinics:

Dr. D. M. GARNER, West Point: "Conduction Anesthesia Employing Dr. A. E. Smith's Method, using Apothesin instead of Novocain."

Dr. W. H. REABAN of McComb: "Showing New Inventions, Applications, and Objects of Art."

Dr. S. L. SILVERMAN, Atlanta, Ga.: "Apicoectomy, Root Amputation, and Exodontia, using Conduction Anesthesia. (1) Apicoectomy. (2) Extracting Impacted Third Molar."

Lieut. P. M. FUGLER, D. R. C., Camp Shelby: "The Use of Dental Splints in War Surgery."

TUESDAY—*Evening Session.*

The meeting was called to order at 8 o'clock by President Wright.

The first order of business was a paper by Dr. CHAS. F. CHANDLER of Montgomery, Ala., entitled "A Comparison of the Different Theories Pertaining to Root-canal Technique," with stereopticon slides.

The next item on the program was a paper by Dr. B. A. BATSON, New Hebron, on "Exodontia."

[This paper is printed in full at page 1006 of this issue of the COSMOS.]

Dr. S. L. SILVERMAN of Atlanta, Ga., gave a lecture and showed slides on "Apicoectomy, Root Amputation, and Exodontia."

Dr. S. W. FOSTER of Atlanta, Ga., read a paper entitled "The Influence of the War on Dentistry and Dental Colleges."

[This paper is printed in full at page 1001 of this issue of the COSMOS.]

BOARD OF TRUSTEES.

Second Meeting.

The meeting was called to order by the chairman at 8 A.M. Wednesday.

Present: J. B. Askew, W. C. Dennis, J. N. C. Moffat, W. R. Wright, A. B. Kelly, T. B. Wright, J. F. Brunson, C. B. Baker, L. B. Price.

A motion was made that the association buy a $500 Liberty Loan bond, sub-

ject to the vote of the association. (Motion carried.)

Dr. J. F. Brunson was elected chairman *pro tem.* Motion was made and carried that the chairman appoint a committee to select all committees for the next annual meeting.

Applications for membership were reported from W. T. Walker, Brooksville; G. W. Davis, Sumrall; C. S. Williams, Ellisville; W. C. Sandusky, Holly Springs; P. E. Lewis, Pachuta; C. L. Clements, Pontotoc; Doyal Stubblefield, Houston. All being properly indorsed, they were elected to membership.

WEDNESDAY—*Morning Session.*

Dr. Wright, president, announced as the first item on the program for the morning session a paper by J. M. GUTHRIE, M.D., entitled "The Relation of Nasal and Oral Sepsis to Systemic Diseases and Surgical Conditions Resulting from Focal Infections."

[This paper is printed in full at page 1003 of the present issue of the DENTAL COSMOS.]

The next item on the program was a paper by Dr. C. E. HINES, Memphis, Tenn., entitled "The Treatment of Pyorrhea."

[This paper is printed in full at page 992 of the present issue of the DENTAL COSMOS.]

The following clinics were then held:

Dr. C. F. CHANDLER, Montgomery, Ala., explaining his "Method of Filling Root-Canals."

Dr. H. D. CHIPPS, Corinth: "Amalgam: Its Use and Manipulation."

BOARD OF TRUSTEES.

Third Meeting.

Present: J. F. Brunson, A. B. Kelly, J. B. Askew, W. R. Wright, J. N. C. Moffat, W. C. Dennis, C. B. Baker, and L. B. Price.

Applications of new members as read before the association: The applicants were duly elected.

Dr. E. A. MAY asked permission to present a bill of expense incurred from work done for the Preparedness League of American Dentists, and also to expend moneys not to exceed twenty-five dollars during the coming year.

Dr. Cooper and Dr. Tillman were elected to fill the places of absent members of the Finance Committee.

Motion was made and carried that the minutes be typed and put in form and paid for by the association.

WEDNESDAY—*Afternoon Session.*

ELECTION OF OFFICERS.

The order of business for the Wednesday afternoon session was the election of officers, which resulted as follows:

President—M. B. Varnado, Osyka.
Vice-president—W. C. Dennis.
Secretary—W. F. Beavers.
Treasurer—C. B. Baker.
Journalist—R. B. Warriner, Corinth.
Delegate to National Dental Association—W. R. Wright, Jackson; J. N. C. Moffat, alternate.
Place of next meeting—Clarksdale.

WEDNESDAY—*Evening Session.*

The meeting was called to order by President Wright at 8 o'clock.

The first item on the program was a paper by Dr. J. N. C. MOFFAT, Shelby, on "Conduction Anesthesia."

[This paper will be published in an early issue of the DENTAL COSMOS.]

The next item for the evening session was a paper by Dr. E. A. MAY, Jackson, entitled "The Application of Business Principles to the Practice of Dentistry."

[This paper will be published in an early issue of the DENTAL COSMOS.]

The next order of business was a paper by Dr. G. B. CLEMENTS, Meridian, on "Dental Science and Literature."

[This paper will be published in an early issue of the DENTAL COSMOS.]

A subscription of $865 was raised for a "progressive clinic" for next year's meeting.

BOARD OF TRUSTEES.

Fourth Meeting.

This meeting took place Thursday A.M.

Present: J. F. Brunson, M. B. Varnado, J. N. C. Moffat, J. B. Askew, C. B. Baker, W. R. Wright, L. B. Price.

Drs. Askew and Varnado were appointed to act on the Finance Committee.

Standing committees for the ensuing year were appointed.

Motion was made and carried that Dr. Brunson be instructed to write Drs. Chandler, Hines, and Brothers, thanking them for their assistance in the program and tendering them compensation for their expenses incurred in attendance.

Application for membership of Dr. T. E. Brent of Laurel was received and accepted.

Adjourned.

THURSDAY—*Morning Session.*

The order of business as announced by the President was the installation of newly elected officers.

The association indorsed the action of the Trustees in regard to the purchase of a Liberty Loan bond by standing vote.

Dr. Brothers of Birmingham and Dr. Hines of Memphis were elected corresponding members.

The association adjourned to meet next year at Clarksdale.

THE DENTAL COSMOS

A MONTHLY RECORD OF DENTAL SCIENCE.

Devoted to the Interests of the Profession.

EDWARD C. KIRK, D.D.S., Sc.D., LL.D., *Editor.*
L. PIERCE ANTHONY, D.D.S., *Associate Editor.*

PUBLISHED BY THE S. S. WHITE DENTAL MFG. CO., PHILADELPHIA, PA.

SUBSCRIPTION PRICE, including postage, $1.00 a year to all parts of the United States, Hawaiian Islands, the Philippines, Guam, Porto Rico, Virgin Islands, Cuba, and Mexico. Canada, $1.40. To other foreign countries, $1.75 a year.

Original contributions, society reports, and other correspondence intended for publication should be addressed to the EDITOR, Lock Box 1615, Philadelphia, Pa.

Subscriptions and communications relating to advertisements should be addressed to the BUSINESS MANAGER of the DENTAL COSMOS, Lock Box 1615, Philadelphia, Pa.

PHILADELPHIA, NOVEMBER 1918.

EDITORIAL DEPARTMENT

Rip Van Winkle, M.D.

THE *Journal of the American Medical Association,* in its issue of September 21, 1918, devotes considerable space to an editorial discussion of "Dental Bacteriology in Relation to Dental Caries." The article in question seems to be an unburdening of the editorial mind of impressions derived from the reading of K. F. Meyer's paper, "The Present Status of Dental Bacteriology," read before the California State Dental Association in July 1916, and published in the *Journal of the National Dental Association*, vol. iv, p. 966.

A number of years ago it was asserted by the eminent editor of a then well-known medical magazine that "the D.D.S. degree would always be the badge of a partial culture," and the dental

profession was solemnly warned to mend its ways and eliminate this stigma on its professional escutcheon by abandoning its distinctive degree and acquiring that insignia of omniscience the M.D. degree, which at the period referred to was conferred after two short sessions of attendance upon the medical curriculum as at that time constituted.

Time has wrought changes and improvements in both medical and dental education. Four years of intensive training is now the standard requirement for the dental course, and its curriculum embraces all of the sciences, including bacteriology and bacteriopathology, that are fundamental to the medical as well as the dental curriculum. Medicine likewise requires four years to complete the standard curriculum leading to its distinctive degree. Hence it will be seen that it takes a course of training just as long to properly educate a dental student in the data relating to the mouth and its contained organs as it does for a medical student to acquire a satisfactory knowledge of everything else appertaining to the human organism apart from the mouth.

We are not yet ready to concede that this marked difference in the relative scope of the two curricula of equal length implies any difference whatever of intellectual capacity in the student material concerned with the study of medicine or of dentistry respectively. It does, however, serve to illustrate the fact that, given equal intelligence to start with, a dental student after four years' intensive study of his special field will know more about the data of his profession than the medical student who has been deluded with the belief that he can compass a knowledge of the entire human organism in the same period of time.

And if the foregoing represents the facts of the situation, it will suggest the desirability of a reconsideration of whether the D.D.S. degree is, after all, and relatively speaking, the badge of a partial culture; whether indeed, and again relatively speaking, it is not the M.D. degree that is open to that type of criticism. Moreover, these same factors apparently go far toward explaining the survival of that ancient mental attitude of omniscience as an attribute of the medical mind as an inheritance from the dark ages when the physician knew relatively so much because no one else knew anything in particular about the body and its functions, either in health or disease.

We are impelled to these animadversions by reason of the remarkable conclusions reached by the editor of the *Journal of the American Medical Association* in the issue referred to. He says, with reference to caries and bacteria:

> Let it be clearly asserted that the relations of cause and effect are by no means clearly demonstrated in the bacteriologic studies of decay made up to this time. But if one is justifiable, from such somewhat indefinite findings as are presented, in assuming that oral micro-organisms are in some way or to some degree responsible for dental decay, it is logically in order to attempt to eliminate the causal agents.

There are numerous other pearls of oracular wisdom to be found in this same editorial, but what we have above quoted is the most illuminating in its bearing upon our contention as to the obsession of medical omniscience. The editorial quotes Meyer as having pointed out that "Neither Miller nor any subsequent investigator has succeeded in finding any organisms strictly specific for caries." Concerning which we might add that the greatness of great minds is often exemplified as much by what they do not do as by what they do. Miller did not believe there was a specific organism for dental decay. Why should there of necessity be an organism specific for caries? Is there such a thing as an organism specific for fermentation or for putrefaction?

The fundamental difficulty in the way of a medical man, or of a bacteriologist or a laboratory biologist, who tries to solve the problem of dental caries, is that none of these have had a dental training, consequently they have no practical knowledge of the natural history of dental caries nor of its clinical phenomena. They regard it from the same angle of view as they do measles, typhoid, or any specific zymotic disease; whereas all reliable evidence at our command strongly points to the conclusion that dental caries is not a disease in any such sense, but is a process of disintegration of tooth structure analogous to that by which the animal organism is disintegrated after death by saprophytic and fermentative agencies. While normal vital teeth succumb to carious action, so also do those without vital connection with the body, and so also do artificial dentures carved from bone or ivory when placed in a mouth the *locus* of a caries-producing environment.

Miller a third of a century ago *demonstrated* the nature of the relation which micro-organisms bear to the causation of dental caries—the rest guessed about it; and many are still guessing as to the "cause" of dental caries. That is another problem involving the question of immunity and susceptibility, and among other things just the lines of research favorably referred to by the editor of the *Journal of the A. M. A.* as being studied by Meyer, Kligler, Gies, *et al.*; but when a magazine which is commonly regarded as the bell-wether of medical periodical literature in America in this twentieth century and a full generation after the publication of Miller's classic researches betrays its ignorance of the status of our knowledge of "Dental Bacteriology in Relation to Dental Caries" by suggesting that we may possibly be justified in "assuming that oral micro-organisms are in some way or to some degree responsible for dental decay," the awakening of Washington Irving's hero of the Village of Falling Water comes irresistibly to one's mind, with its mental vacuity as to past events—a condition in the present instance for which two methods suggest themselves as a remedy: either a careful study of Miller's classic research, or a regular course of study in a modern dental school.

A Correction.

As a result of one of those unaccountable lapses which occasionally overtake the most expert, our proofreader designated iodin trichlorid as an "anesthetic" instead of an antiseptic as was clearly intended in the footnote on page 908 of our October issue. We apologize both to the author and to our readers for this error. —Ed. Cosmos.

PRACTICAL HINTS

This Department specially welcomes the brief presentation by our readers of any novel suggestions or methods which in their own practice have proved to be time-saving or to possess other features of advantage.

Application of Silver Nitrate Solution in Root-canal Work.

By WALTER F. PROVAN, D.M.D., Boston, Mass.

As certain dentists have found difficulty in applying Dr. Howe's silver nitrate solution in root-canal work. Perhaps the method I employ in my practice may be of help to some.

There are several different conditions which may be presented, and these can be met in various ways. In the first place the root-canal in all cases must be cleaned out thoroughly. Next it is necessary to get the silver nitrate solution (solution No. 1) to the apex. Capillary attraction will not take it there if the root-canal is dry, as air will be caught in the upper end of the canal. It is quite difficult to dislodge this air with a smooth broach, and besides, the danger of lacerating the tissue beyond the end of the root is very great.

This difficulty will be easily overcome if a Johnson & Johnson sterile cotton point is saturated in solution No. 1 and inserted to the apex. The point is soft, and will not injure the apical tissue. This will moisten the walls of the canal all the way down. Next, a drop of the solution is introduced in the pulp chamber with a pair of clean cotton pliers. A little careful manipulation with a smooth broach will now aid capillary attraction to draw the liquid to the end of the root. Allow this application to remain for three or four minutes, and then with another pair of pliers add a drop of solution No. 2. Again use the smooth broach carefully, and wait for three or four minutes more.

Now dry out the canal slightly with another cotton point and add another drop of solution No. 1. To this add a drop of eugenol, and again use the smooth broach carefully. Wait three or four minutes more and then dry out all the excess moisture from the canal with cotton points. Now introduce some chloro-percha on a smooth broach until the root-canal is full, then pack in some gutta-percha points until the canal filling is a homogenous mass, and hard. This can be done with canal pluggers. Flow cement over the gutta-percha, and the operation is completed.

If advisable for any reason the gutta-percha filling can be postponed until a subsequent sitting, in which case the tooth must be sealed tightly, and no other dressing is necessary. If this waiting method is used repeat the application of the silver nitrate solution, as described above, at the second sitting, and then proceed with the gutta-percha filling.

When eugenol is used there is very

seldom any subsequent soreness. When it is not used and there is subsequent soreness, I believe it is due to irritation at the periapical region, caused in a large number of these cases by the medicament itself. Cases arising from this cause would seem to show that the use of eugenol was indicated.

When eugenol is used and a subsequent soreness develops, I believe it can be rationally explained, as follows: The precipitation which follows the addition of solution No. 2 and eugenol to solution No. 1 seals the apical foramina if they are small, and if they are large, the gutta-percha filling does it. This precipitation effectually sterilizes the root-canal, and with the gutta-percha filling cuts off any subsequent reinfection from this source, but there is an apical infection existing which has not yet been dealt with, and nature has to clear up this infected region.

The vent for gas or pus has been sealed, and unless these can be absorbed as fast as they are formed, soreness is sure to develop. If this kind of trouble arises and pus forms, do not ream out the root-canal. A lancet-thrust will give relief, and the case will clear up of itself. Careful technique is as necessary with this method as with any other successful one.

139 Newbury st.

Review of Current Dental Literature

[*International Abstract of Surgery*, Chicago, August 1918. (*Supplementary to Surgery, Gynecology, and Obstetrics.*)]

War Injuries of the Face and Jaws: Collective Review. By Robert H. Ivy.

This review is a collation of ninety-three articles which have been selected with rare judgment from the enormous mass of literature on war surgery of the face and jaws, in American, British, French, Italian, Swiss, and German journals. The work has been done with painstaking elaborateness, accuracy, and detail. The experiences and views of seventy authors have been intelligently condensed and synthesized into the harmonious entity which Ivy herewith presents to us. This concise and authoritative summary should be studied at first hand by every dentist expecting to enter military service. The bibliography, which we append *in toto* from the original, is the most complete and important working index on this subject which has yet appeared.

In the field of facial surgery the first principle to stand out is the importance of the close association of the surgeon with the dentist in the treatment of these cases, which attract particular attention by reason of the disfigurement which they cause. The second principle is that a definite plan of treatment should be initiated at the earliest possible moment after the receipt of the injury.

Mandibular fractures are classified according to the seat of the lesion (symphysis, body, ascending ramus, condyloid and coronoid processes), and also according to whether or not there is loss of substance. Under the plan of early special treatment the fractures are easily reduced, permitting the insertion of a fixation appliance with the teeth in normal occlusion (30). Several forms of temporary splints have been devised (74). Following this, at the earliest possible moment, full access is surgically secured to the fracture with the purpose of limiting hemorrhage, sepsis and necrosis, and obtaining a limited and relatively aseptic scar. This is an indispensable preliminary to a systematic ap-

plication of bone surgery (89, and, in part, 90). In this primary operation it is particularly essential that no loose fragments of bone be removed from the site of the fracture, as in many cases pieces of bone apparently hopelessly injured will recover their vitality and serve as a valuable matrix for repair (51).

When the time comes for definitive fixation, if reduction is resisted by scar tissue or callus, surgical division of the soft tissue or callus is indicated, followed by immediate fixation of the fragments in correct position. The form of fixation to be applied depends upon the location of the fracture, the amount of substance lost, the amount of displacement, the number, condition, and position of the teeth present. Among the most instructive papers bearing on this question are Nos. 12, 28, 36, 38, 41, 42, 50, 51, 81, 84, and 82.

The majority of gunshot fractures of the mandible involve the body of the bone anterior to the last existing tooth, and are characterized by considerable displacement and loss of substance. Two schools of practice may be recognized in the handling of cases with loss of substance: (*a*) that which considers that consolidation of the fracture should be assured by drawing together the ends of the bone even at the sacrifice of the normal occlusion of the teeth (89, 49, 12), and (*b*) a group to which the majority of workers belong who believe that the re-establishment of the normal occlusion of the teeth is the primary consideration. For this latter group, the best method of maintaining separation and of fixing the fragments in their normal position in relation to the upper teeth in the majority of cases of gunshot fractures of the mandible, is by the metal band and wire splint, consisting of a stout wire spanning the gap, attached by crowns or bands to sound teeth on each side (50 and 51). For fractures of the upper jaw there is employed a modified Kingsley bar splint, attached with straps to the vertex of the skull.

The complications of gunshot wounds of the face and jaws are hemorrhage (90, 53), pneumonia (51, 90), grave local and general sepsis (90), trismus (47, 57), pseudo-arthrosis, facial paralysis (67), and salivary fistulæ (68, 15, 76, 14).

Where hemorrhage is persistent and resists local measures, ligation of the individual artery supplying the part is resorted to. Broadly speaking, (*a*) bleeding from the floor of the mouth comes from one or both lingual arteries or their branches; (*b*) from between the fragments of a broken mandible, arises from the inferior dental; (*c*) from the cheek or lip, has its origin in a branch of the facial; from the pharyngeal and tonsillar regions, will call for ligation of the external carotid. If it be impossible to determine the individual artery involved, or if the case be particularly urgent, the external carotid may be ligated high up so as to avoid thrombosis and embolism in the common carotid.

Infections of the respiratory tract (bronchitis and broncho-pneumonia) are often induced in septic mouth cases by the use of general anesthesia (51, 90). Consequently local anesthetics should always be employed wherever possible. Since the completion of Ivy's summary, there have appeared two papers which have for their particular purpose the elimination of these dangerous bronchial and pulmonary sequelæ to general anesthesia (Wade and Rockey, DENTAL COSMOS, October 1918, p. 942).

Where the trismus or constriction (47, 40, 12, 44, 90, 57) is due to bony ankylosis, surgical interference is necessary; but where it is due to cicatricial bands of connective tissue or to pertinacious and high grade contraction of the muscles of mastication, it may be relieved by spreading the jaws apart by one or another of the many forms of mouth-openers which have been devised, with moderate but sustained pressure, or by forcible stretching under anesthesia, and after-treatment with screw gags.

The indications, technique, and results of bone or cartilage transplantation in pseudo-arthrosis have been given the close attention of many workers (48, 59, 19, 81, 32, 46, 8, 64, 65, 66, 62, 63, 85). Ivy has carefully analyzed this literature. Bone-grafts are indicated, according to practically all authors, only in old cases of pseudo-arthrosis. Aside from cases with great loss of substance, the bone-grafting operation should always have been preceded by a prolonged treatment by prosthetic fixation whose inefficiency should have been well demonstrated. The essential requirements emphasized by practically everyone for successful grafting are as follows:

(*a*) Operation should be performed only in the absence of any inflammatory or pathological condition in the region; (*b*) communication of the mouth cavity with the wound must be avoided; (*c*) it is indispensable that as perfect immobilization as possible be assured by apparatus fixing the lower teeth to the upper.

But a single case of facial paralysis due to gunshot injury is described (67). This was treated by muscle anastomosis. This operation, while far from restoring function, nevertheless caused to a large extent the disappearance of the asymmetry of the face when the muscles are at rest.

For salivary fistulæ, the simple method of immobilization of the jaws (76), while not infallible, is always worthy of trial. Other methods of treatment (14 and 15) have already been refererd to in the DENTAL COSMOS (Dieulafé and Deupès, April 1918, p. 352).

The question of feeding is a highly important one (81, 12, 51). Not only must the diet be nutritious to insure a maintenance of or even a gain in bodily vigor, but it must be as varied as possible and presented in an inviting form to uphold the personal morale of the patient. The character of the diet will, of course, be determined by the general state. It must, at first at least, be wholly liquid, and hence administered in large amounts at relatively frequent intervals. If possible, the menus of two consecutive feedings should be decidedly different. There is no mention of a case where rectal feeding was necessary.

The cosmetic or esthetic phase of facial war surgery has not been neglected. That psychically this is of great importance to the patient has been signalized by A. von Wagner (*Oesterr. Zeitschrift f. Zahnheilkunde*, 1916, Jg. xiv, p. 201), "Beobachtungen ueber den Einfluss der Kiefer- und schweren Gesichtsverletzungen auf die Psyche").

Plastic repair of war injuries of the soft parts is brought about by the employment of various well-known methods used in civil practice, viz, by free Wolff and Thiersch grafts, by sliding flaps from neighboring parts, by pedicled flaps from near by or from distant parts (10, 24, 25, 33, 35, 43, 70, 60, 61, 77, 78, 79, and 90). Most of the authors insist on immediate replacement after injury of the lacerated tissues into their approximately correct position, thus enormously facilitating later corrective measures. Secondary plastic operations should not be performed too early when infection is still present in the scar tissue. While waiting for the subsidence of infection, the time can be utilized for controlling and limiting contraction of the scar tissue as far as possible.

The operative treatment of the case of facial paralysis (67) mentioned in Ivy's abstract, in large part belongs to this consideration of cosmetic restorations. Also for this purpose, need may arise for resort to bone or cartilage transplantation (*q. v. supra*).

The general consensus of opinion favors local and regional anesthesia for the performance of secondary plastic operations on the face and jaws. The anesthetic of choice is novocain-adrenalin. For technique see 88 and 7. Where general anesthesia is to be used, it would be well to consider the advice and methods of Wade and Rockey (DENTAL COSMOS, October 1918, p. 942).

Prosthetic facial reconstruction requires on the one hand great artistic ability, and on the other, mechanical ingenuity. The replacement of lost features by painted copper masks is considered in article 93. A plastic material has been adapted for this purpose (78, 79, 80), which can be adjusted from time to time by the patient himself.

To summarize the five foregoing paragraphs, the cosmetic or esthetic phase of facial surgery involves a consideration of (1) plastic surgery of the soft parts, (2) bone and cartilage transplants, (3) muscle anastomoses (67), and (4) the employment of prosthetic appliances for facial reconstruction.

BIBLIOGRAPHY.

1. BALDWIN, M., PAYNE, J. L., HAYES, G. B., and others. War injuries of the jaw and face. Proc. Roy. Soc. Med., 1916, ix, Sect. Odontol., 63.
2. BENNETT, N. G. War injuries of the jaws. Practitioner, Lond., 1917, xcix, 201.
3. BLAIR, V. P. Septic parotitis. Med. & Surg., 1917, i, 34. Dental Cosmos (rev.), 1918, lx, 125.
4. BOUTY, R. J. C. Vincent's angina among troops in France. Brit. M. J., 1917, ii, 685.
5. CABOCHE, H. Traitement des mutilations les plus fréquentes de l'auvent nasal, par traumatismes de guerre. Restauration maxillo-faciale, Par., 1917, p. 237.
6. CAMPION, R. B. Some notes on seventy-two cases of gunshot wounds of the face with fracture of the maxillæ. J. Roy. Army M. Corps, Lond., 1916, p. 106.
7. CANUYT, G., and ROZIER, J. L'Anesthésie locale pour les interventions chirurgicales

sur les sinus frontales et maxillaires. Restauration maxillo-faciale, Par., 1917, p. 289.

8. Cavalié. Traitement des pseudarthroses du maxillaire inférieur. Bull. et mém. Soc. de méd. et chir. de Bordeaux, 1917, p. 93.

9. Cole, P. P. Plastic repair in war injuries to the jaw and face. Lancet, Lond., 1917, i, 415.

10. Idem. Treatment of wounds involving the mucous membrane of the mouth and nose. Lancet, Lond., 1918, cxciv, 11.

11. Cole, P. P., and Bubb, C. H. Deformities of the jaws resulting from operation or injury. Brit. M. J., 1916, i, 268.

12. Colyer, J. F. Injuries of the mandible in military practice. Brit. Dent. J., 1917, xxxviii, War Suppl., 57.

13. Davenport, W. S. Multiple fracture of the mandible and lost substance restored by bone graft. Dental Cosmos, 1916, lviii, 1135.

14. Deupès. Apropos de deux cas de fistules glandulaires parotidiennes guéris par la résection du nerf auriculo-temporal. Restauration maxillo-faciale, Par., 1917, p. 189. Dental Cosmos (rev.), lx, 352.

15. Dieulafé, L. Les fistules salivaires. Restauration maxillo-faciale, Par., 1917, p. 197. Dental Cosmos (rev.), lx, 352.

16. Dolamore, W. H. The prevention of deformity following fracture or resection of the jaw; a plea for the early use of suitable splints. Brit. J. Surg., 1915–16, iii, 526. Dental Cosmos (rev.), lx, 258.

17. Idem. Report of the Dusseldorf Hospital for injuries of the jaws. Brit. Dent. J., 1917, xxxviii, War Suppl., 98.

18. Doubleday, F. N. Cases of gunshot injury of the face and jaw, with special reference to treatment. Proc. Roy. Soc. Med., 1917, x, Sect. Odontol., 51. Dental Cosmos (rev.), lix, 1265.

19. DuBouchet, C. W. New method of bone grafting for pseudarthrosis of the mandible. Bull. et mém. Soc. de chir. de Par., 1917, xliii, 1328.

20. Dufourmentel, Frison, Bonnet-Roy, and Brunet. Treatment of war fractures of the maxillary bones. Paris méd., 1917, vii, 202.

21. Duval, P. War wounds of the soft parts. Bull. et mém. Soc. de chir. de Par., 1917, xliii, 1739.

22. Egger. Reconstruction of the jaws after war wounds. Cor.-Bl. f. schweiz. Aerzte, 1917, xlvii, 1365.

23. Esser, J. F. S. Healing of lower jaw-bone defects in war cripples. Am. J. Surg., 1917, xxxi, 305. Dental Cosmos (rev.), lx, 172.

24. Idem. Plastic work on the face. Surg., Gynec. & Obst., 1917, xxiv, 737.

25. Idem. Studies in plastic surgery of the face. Ann. Surg., Phila., 1917, lxv, 297.

26. Frey, L. Causerie bibliographique. Restauration maxillo-faciale, Par., 1917, p. 94, 229.

27. Idem. Le musée du Val-de-Grâce. Restauration maxillo-faciale, Par. 1917, p. 54, 86, 136, 277.

28. Idem. Prosthetic restoration in fractures of the maxillaries and mutilation of the face. Restauration maxillo-faciale, Par., 1917.

29. Frison, L. La stomatologie pendant la guerre. Paris méd., 1917, vii, 190.

30. Frison, L., and Brunet. De l'utilité d'un centre maxillo-facial dans la zone des étapes d'une armée. Restauration maxillo-faciale, Par., 1917, p. 215.

31. Fry, W. K. Treatment of gunshot wounds of the mandible and maxilla. Lancet, Lond., 1917, cxciii, 852. Dental Cosmos (rev.), lx, 172.

32. Gallie, W. E., and Robertson, D. E. Transplantation of bone. J. Am. M. Ass., 1918, lxx, 1134. Dental Cosmos (rev.), lx, 533.

33. Gilles, H. D. Two cases illustrating plastic and dental treatment. Lancet, Lond., 1917, cxciii, 850. Dental Cosmos (rev.), lx, 172.

34. Gosset, A. Extraction of projectiles embedded in the pterygo-maxillary fossa. Bull. et mém. Soc. de chir. de Par., 1915, xlii, 1026.

35. von Hacker. The plastics of penetrating cheek defects due to gunshot injuries. Beitr. z. klin. Chir., 1916, xcviii, 289.

36. Hayes, G. B. War dental surgery; some cases of maxillofacial injuries treated in the dental section of an American ambulance at Neuilly, France. Dental Cosmos, 1916, lviii, 249, 389, 511, 658, 758, 1012, 1143.

37. Herpin, A. Considerations anatomiques sur les fractures du maxillaire inférieur. Restauration maxillo-faciale, Par., 1917, p. 35.

38. Idem. Fractures of the angle and ascending ramus of the mandible. Presse méd., Par., 1916.

39. Idem. Observations de fractures des maxillaires. Restauration maxillo-faciale, Par., 1917, p. 154, 192, 232, 282.

40. Idem. Simple jaw stretcher. Presse méd., Par., May 8, 1916.

41. Idem. Treatment of fractures of the horizontal portion of the mandible. Presse méd., Par., 1916.

42. Idem. Treatment des fractures du maxillaire inférieur au centre de Bordeaux. Gaz. hebd. d. sc. méd. de Bordeaux, 1917, xxxviii, 43.

43. Horsley, J. S. Plastic operation for acquired deformities of the face. J. Am. M. Ass., 1916, lxvi, 411.

44. Huguet, C. Ecarteur à action continue pour contracture des mâchoires. Restauration maxillo-faciale, Par., 1917, p. 226.

45. Imbert, L., Lheureux, C., and Rouslacroix. Recherches sur les greffes cartilagineuses hétéroplastiques. Rev. de chir., Par., 1916, li, 3.

46. Imbert, L., and Réal, P. Bone grafting in fractures of the lower jaw with large loss of substance. Restauration maxillo-faciale, Par., 1917, p. 20.

47. Idem. Constriction of the jaws following war wounds. Presse méd., Par., 1916.

48. Idem. Le traitement chirurgical des pseudarthroses du maxillaire inférieur. Marseille méd., 1916, liii, 193.

49. Idem. Unilateral fractures of the mandible with loss of substance; their treatment by the swinging forward of the posterior fragment. Brit. Dent. J., 1917, xxxviii, War Suppl., 45.

50. Kazanjian, V. H. Treatment of maxillary fractures. Brit. M. J., 1916, i, 266.

51. Idem. Immediate treatment of gunshot fractures of the jaws. J. Allied Dent. Soc., N. Y., 1917, xii, 29.

52. Idem. Suture des esquilles osseuses pour l'immobilization des fractures étendues du

maxillaire inférieur. Restauration maxillo-faciale, Par., 1917, p. 169.
53. Kazanjian, V. H., and Burrows, H. Treatment of hemorrhage caused by gunshot wounds of the face and jaws. Brit. J. Surg., 1917, July, p. 126.
54. Lilienthal, H. A method of incising a parotid abscess without injury to the facial nerve distribution. Am. J. Surg., 1917, xxxi, 101. Dental Cosmos (rev.), lix, 930.
55. Martinier, P., and Lemerle, G. Prosthèse restauratrice bucco-faciale et traitement des fractures des maxillaires. Paris, 1915.
56. Massobrio, G. War fractures of the mandible and their surgical treatment. Policlin., Roma, 1917, xxiv, 993.
57. Matti, H. Reconstruction of the jaws after war wounds. Cor.-Bl. f. schweiz. Aerzte, 1917, xlvii, 1361.
58. McKinstry, W. H. Vincent's disease of mouth and pharynx. Practitioner, Lond., 1917, xcix, 507.
59. McWilliams, C. A. The treatment of the bony defects of the lower jaw. Ann. Surg., Phila., 1917, lxv, 283. Dental Cosmos (rev.), lix, 837.
60. Morestin, H. Autoplastics in mutilations of the lips and cheeks by war wounds. Bull. et mém. Soc. de chir. de Par., 1916, xlii, 3193.
61. Idem. Brèche palatine comblée aux dépens de la muqueuse génienne. Bull. et mém. Soc. de chir. de Par., 1916, xlii, 1711.
62. Idem. Reconstruction of the malar bone by cartilage transplant. Bull. et mém. Soc. de chir. de Par., 1916, p. 1306, 1314, 1397, 1700.
63. Idem. Les transplantations cartilagineuses appliquées à la reconstitution du maxillaire supérieur. Bull. et mém. Soc. de chir. de Par., 1915, xli, 2459.
64. Idem. Les transplantations cartilagineuses appliquées à la réparation des grandes pertes de substance du maxillaire inférieur. Bull. et mém. Soc. de chir. de Par., 1915, xli, 2418.
65. Idem. Les transplantations cartilagineuses appliquées à la réparation des grandes pertes de substance du maxillaire inférieur. Bull. et mém. Soc. de chir. de Par., 1917, xliii, 301. Dental Cosmos (rev.), lx, 172.
66. Idem. Les transplantations cartilagineuses dans la chirurgie réparatrice. Bull. et mém. Soc. de chir. de Par., 1915, xli, 1994.
67. Idem. Treatment of facial paralysis due to gunshot injury by muscular anastomosis. Bull. et mém. Soc. de chir. de Par., 1916, p. 370.
68. Idem. Contribution to the study of the treatment of salivary fistulæ consecutive to war wounds. Bull. et mém. Soc. de chir. de Par., 1917, xliii, 845.
69. Moure, E. J. Contribution a l'étude de la rhinoplastie. Restauration maxillo-faciale, Par., 1917, p. 157.
70. Idem. Plaies de la face et des maxillaires. Restauration maxillo-faciale, Par., 1917, p. 5.
71. Idem. Trois cas de paralysies faciales traumatiques operées : presentation de malades. Bull. et mém. Soc. de méd. et chir. de Bordeaux, 1916, lxxxvii, 179.
72. New, G. B. The use of celluloid in the correction of nasal deformities. J. Am. M. Ass., 1918, lxx, 988.
73. Payne, M. J. Restoration of lost portions of the jaw by surgical means. Brit. Dent. J., 1916, xxxvii, War Suppl., 273.
74. Pickerill, H. P. Treatment of fractured mandible accompanying gunshot wounds. Interst. M. J., 1916, xxiii, 501.
75. Pierre-Robin. Functional restoration of lower maxilla in cases of fracture with loss of substance. Presse méd., Par., 1917, xxv, 35.
76. Piétri, P. Le repos absolu des mâchoires comme traitement des fistules salivaires parotidiennes traumatiques. Restauration maxillo-faciale, Par., 1917, p. 105.
77. Idem. Autoplasty of the face, according to the method of Professor Moure. Presse méd., Par., 1917, July, p. 388.
78. Pont, M. A. Cheiloplastie et prothèse nasale. Lyon méd., 1916, cxxv, 331.
79. Idem. Restoration of the nose. Lyon méd., 1917, cxxvi, 508.
80. Idem. Rhinoplastie et prothèse nasale. Restauration maxillo-faciale, Par., 1917, p. 57.
81. Idem. Traitement des fractures du maxillaire inférieur. Lyon méd., 1916, cxxv, 294.
82. Roy, M., and Martinier, P. Le traitement des blessures de guerre de la région maxillo-faciale. Odontologie, Par., 1915, liii, 265; 1916, liv, 5, 50, 77, 101, 141, 188, 240.
83. Sauvez. Classification of the treatment of fractures of the mandible. Brit. J. Dent. Sc., Lond., 1917, lx, 10.
84. Schroeder, H. War injuries of the lower jaw. Med. Klin., Berlin, 1914, x, No. 50.
85. Sebileau. Bull. et mém. Soc. de chir. de Par., 1917, xliii, 301.
86. Speakman, W. C. Fractures of the maxillaires. Med. & Surg. 1916, xxxix, 514.
87. Taylor, F. E., and McKinstry, W. H. A serological investigation of Vincent's angina. Brit. M. J., 1918, January 19. Dental Cosmos (rev.), lx, 449.
88. Thoma, K. H. Extra-oral conductive anesthesia for oral surgical operations. Am. J. Surg., 1917, xxxi, 14.
89. Trotter, W. Suggestions toward a systematic operative treatment of gunshot wounds of the mandible. Brit. M. J., 1918, Jan. 12.
90. Valadier, A. C., and Whale, H. L. Report on oral and plastic surgery and on prosthetic appliances. Brit. J. Surg., 1917, July. Dental Cosmos (rev.), lix, 1041.
91. Villain, G. Les fractures mandibulaires post-élévateurs. Restauration maxillo-faciale, Par., 1917, p. 139.
92. Idem. Traitement physiologique des fractures post-élévateurs. Restauration maxillo-faciale, Par., 1917, p. 315.
93. Wood, F. D. Masks for facial wounds. Lancet, Lond., 1917, cxcii, 949.

[*Bulletin de l'Académie de Médecine*, Paris, July 9, 1918.]

Measurement of the Force of the Jaws.

By Pierre Robin.

The particular purpose of this study is to aid in the recognition of functional disabilities sequent to war wounds, and in the discovery of malingerers. It is obvious that the

patient cannot eat (1) if he lacks a certain number of teeth, (2) if his mouth cannot be sufficiently opened, and (3) if his masticatory mechanism lacks the sufficient muscular force. Robin's buccal dynamometer objectively records the degree to which the mouth can be opened, and the masticatory muscular force. The construction of the instrument is briefly described.

[*Colorado Medicine*, Denver, August 1918.]

Asepsis and Antisepsis in Modern Dentistry. By S. W. Schaefer.

Modern dentistry as commonly practiced is partly still in the pre-Listerian period, partly in the antiseptic period, and only to a slight extent in the modern aseptic stage.

The greater aseptic technique that seems advisable may be considered under three heads: Care of hands, of instruments, and of towels, napkins, and dressings. As to the hands: Mere scrubbing of the hands with a handbrush is probably all that is necessary for the average dental work, unless the hands become infected with pathogenic material (pus, calculus, saliva, etc.), when in addition they should be soaked in alcohol or a solution of mercuric chlorid. In the filling of root-canals, Schaefer believes sterile rubber gloves will be those worn by the dentists who get the best results.

As to the instruments, they should be sterilized by boiling, and after boiling *should be kept sterile*. For this latter purpose sterile towels and dressings are a necessity. All towels that cover the operating stand, and all cotton and gauze that goes into the patient's mouth, should be sterilized by steam. By having the operating stand covered with a sterile towel, the instruments after they have been boiled can be laid thereon without danger of becoming reinfected. After the operation the instruments should in every case be boiled before being replaced in the cabinet, so as to prevent any infection of the cabinet, and then should be boiled again immediately before use.

In the operating room there should be no dry dusting or sweeping. The handpiece should be wiped before each operation with a cloth wet with alcohol or a dilute phenol solution, or better still, be boiled in a soap solution.

Between cases, the part of the X-ray apparatus that it is necessary to touch in making adjustments should be cleaned with alcohol or a phenol solution.

[*Riforma Medica*, Naples, March 30, 1918.]

A Case of Noma Following Paratyphoid B. By Enzo Romanelli.

The case was that of a boy of twelve years. On the fifth day of the paratyphoid fever, the oral symptoms began to manifest themselves. Clinically they were recognizable as noma, which was confirmed by the microscopic examination (spirochetes, micrococci, and fusiform bacilli). Bact. diphtheriticum could not be found. Arseno-benzol, for the noma, was injected and applied locally without benefit. Death resulted.

PERISCOPE

Malformations of Jaws and Teeth.—Robin (*Paris Medical*, June 1918) has found in many cases that some malformation of the jaw, of teeth, or cheek in children was responsible for inadequate mastication or inadequate intake of air. His illustrations and clinical histories confirm the importance of correction as the first step in causal treatment of disease in the stomach, bowel, or chest.—*Journ. A. M. A.*

Soldering Contact Points on Inlays and Crowns.—The quickest and easiest way is to heat in the flame until red and then cool in the air, which oxidizes the whole surface. Now by means of a toothpick (one of the very few uses a toothpick serves), place a smear of flux paste just over the area where the solder is to flow; place a piece of solder, and flow—it will not flow where there is no flux. —Earle H. Thomas, *Dental Review*.

Ionization.—In electric ionization the conducting wire, electrode holder, and active electrode should all be so light in weight that they may be easily supported by the tooth or root being treated. Make a light holder by running about an inch of ordinary copper bell-wire into the rolls to flatten it, and wind this thin, flat part in a spiral around the base end of an ordinary barbed broach. Let the base of all active electrodes be made to slip into this spiral spring holder. A barbed broach makes a splendid active electrode where the metal does not matter. This holds properly a very small amount of cotton at the tip, and also prevents the electrode from slipping out of the root-canal.—F. D. Price, *Oral Health.*

Idiosyncrasy to Dichloramin-T.—Soto relates that he applied dichloramin-T in a case of rebellious purulent ethmoiditis. He ordered the woman to use the dichloramin-T in a 0.5 per cent. dilution, in the form of a spray, morning and evening. The atomizer used was made entirely of glass, and she was instructed not to squeeze the bulb more than ten times at one application. By the fifth day of this treatment the nose, lip, and cheeks had become much swollen and blistered, as also the nasal mucosa. On suppression of the spray the whole subsided in a few days. Thinking that the preparation of the spray had been defective, he had a new supply prepared, but this caused the same disturbance as before, even more pronounced.—*Jl. A. M. A.*

Importance of a Proper Contact Point.—If there is any one spot about a filling of which it can be said "That is the most important part of the whole operation, the part upon which depends the success or failure of the whole work," that spot is the contact point. Its importance is like the keystone of an arch; unless present in its proper form all the surrounding work will fail. If the contact point is omitted the first evil to follow is the leaking of food into the space during mastication, causing great annoyance to the patient, and being a constant menace to the filling at its weakest point—the gingival margin. Or the teeth may work together, as they sometimes do, in which case there will be a contact surface extending all the way from the occlusal to the gingival, which would bring the margins of the filling in contact with the surface of the approximating tooth, and what could more surely invite recurrence of decay?—Horace I. Beemer, *N. J. Dental Journal.*

Blocking the Ophthalmic Branch of the Fifth Nerve.—The blocking of this branch is becoming of more interest to the dental surgeon at this time, owing to war injuries of the maxilla. The blocking of the maxillary branch in such cases would not prove adequate for complete anesthesia unless we included the ophthalmic branch. The same general technique that is used for the maxillary branch, with only two exceptions, can be followed. To avoid trouble with the internal maxillary artery, the injection should be slightly to the buccal. The depth of penetration should be from four to five centimeters, allowing the needle to hug the bone closely. Five cc. of a two per cent. solution of novocain will be sufficient for complete anesthesia.—F. W. Frahm, *Pacific Dental Gazette.*

Wax Inlay Technique.—Use a wax that has a high melting-point; one that will not be disturbed by body temperature. Warm the wax in hot water so that it may be easily placed in position; chill, remove, carve, polish, and mount with a sprue wire attached at the contact point; now clean the surfaces of the inlay with acetone and a fine camel's-hair brush before investing. Be sure to use the proper amount of water and investment material necessary for a perfect mix. When mixing the investment material tap the mixing bowl repeatedly to dislodge all air-bubbles, pour the investment, and allow it to set for twenty-five minutes; then you can slowly burn the wax out of and anneal the investment. The casting can be done in either a hot or cold mold, using either 22- or 24-k. gold.—*American Dentist.*

Recurrent Dislocation of Lower Jaw.—Tying up the coronoid process or the tissues inserted on it to the zygoma is suggested by Blake (*Annals of Surgery*, August 1918) as an operation in these cases. This procedure is less difficult than any careful and accurate work on the joint itself, and further, it acts to a much greater mechanical advantage, in that the coronoid is 3 or 4 cm. in front of the joint, and is by so much in a better position to withstand trauma tending to dislocation. A case is cited in which this procedure was employed successfully. An incision was made along the lower border of the zygomatic arch, and the fibers of the masseter separated from it. This incision was well above Stenson's duct and parallel to the facial nerve fibers. With some difficulty the coronoid process was reached; it was much deeper than had been anticipated, and Blake was not able

to do what he had originally planned—this was to drill through the tip of the coronoid, thread a piece of silver wire through the hole, and lace this over the zygoma. He therefore looped the wire first over the zygoma and then brought it down and carried it through the insertion of the temporal muscle and the periosteum on the front of the coronoid. twisted the ends together, flattened it, and closed the wound without drainage. The wire loop was long enough to allow the jaw to open for 2 cm. or 1 inch between the incisors. The masseter was carefully sutured to its origin; bandages held the jaw closed, and the wound healed by first intention. The jaw was immobilized three weeks. More than a year after the operation, the jaw is normal and reliable in every way, the excursion being about 4 cm. at the incisors.—*Journ. A. M. A.*

To Reduce Expansion and Contraction of Amalgam.—To reduce the expansion and contraction of an amalgam to the lowest possible point is largely a matter of mixing. The manufacturer may have made as nearly a balanced alloy as it is possible for him to produce, and yet the finished filling will fall far short of the possibilities of the alloy because of a careless use of mercury in the amalgamation, and also in the packing of this plastic material in the cavity. The operator should always weigh in an accurate balance both the mercury and alloy, allowing a very slight excess of mercury to secure a smooth mix and aid in packing. This excess should not be removed until the filling has been very thoroughly condensed by careful stepping with a suitable plugger, sufficiently large to prevent the inclosing of any air-spaces. The excess mercury should be removed with the portion of the mix remaining above that which was needed for the filling of the cavity.—F. W. Frahm, *Pacific Dental Gazette.*

The Porcelain Inlay.—After all these years in the practice of porcelain, and being one of the few who have made a record that stands as a guide to a great many, the question suggests itself, "What have I found that has represented the most substantial feature leading toward success?" The answer is, depth of cavity and bulk of material. It is very gratifying to see cases after twenty to twenty-five years that are looking practically as well as the day they were inserted, and those cases were made at a time when simplicity of cavity formation was the first objective. At that time there was not any discussion about how a cavity should be formed, as there were few who knew anything about cavity formation. So we used a simple form, and today these few basal directions are not improved to any material extent.

Regarding the direct or indirect method, I stand here as an exponent of the direct method, as I have yet to see the indirect method used where there was not more tooth structure cut away than was necessary, and I have great reverence for the preservation of tooth structure. All the indirect methods I have seen have, as a rule, been rather ruthless, and excessive tooth-cutting has been resorted to.—W. A. Capon, *Journ. N. D. A.*

The Caduceus and the Emblem of the Medical Profession.—The caduceus, the rod surmounted by the extended wings and entwined by the two serpents, though regularly used in that connection, is not especially the emblem of the medical profession. According to the Century Dictionary the caduceus is a symbol of peace and prosperity, and in modern times figures as a symbol of commerce. The rod or wand is supposed to be the wand of Mercury, the god of commerce. The rod represents power; the serpents represent wisdom, and the two wings, diligence and activity. As stated by Dr. Samuel P. Gerhard (*Journ. A. M. A.*, April 24, 1909), the true ancestral symbol of the healing art is the knotty rod and serpent of Esculapius, the device adopted for the emblem of the American Medical Association. The significance of this device is much the same as that ascribed to the caduceus, but as Dr. Gerhard has shown from history and mythology, the serpent as the representative of wisdom has been from time immemorial linked up with the healing art. Dr. Gerhard says:

Esculapius was always pictured with a knotty rod in his hand, the knots indicating the many difficult problems of physics to be solved in the treatment of the ailments of mankind. Therefore, applying these thoughts to the symbol, we have in the entwined serpent power, wisdom, and health, together with the protection and support against disease and the difficulties to be overcome by the knotty rod. With this historical symbol the sanctity of medicine can be pictured, and the doctor is shown in his true light, not only as a laboratory scientist and as a practitioner, but as a teacher and adviser to the patient, the family, and the community, in all the difficult problems that arise concerning health and disease.—*Journ. A. M. A.*

Preparedness League of American Dentists.

ORGANIZED UNDER THE AUSPICES OF THE N. D. A.

THE DENTAL COMMITTEE OF THE GENERAL MEDICAL BOARD, WHICH IS THE AGENCY FOR THE MEDICAL AND DENTAL PREPAREDNESS IN THIS WAR EMERGENCY, HAS MADE IT POSSIBLE FOR EVERY DENTIST IN THE UNITED STATES TO ASSIST IN THE WORK, UNDER THE SUPERVISION OF THE PREPAREDNESS LEAGUE OF AMERICAN DENTISTS. HEADQUARTERS AT 50 EAST 42D ST., NEW YORK, N. Y.

Preparedness League Notes and News.

By R. OTTOLENGUI, *Publicity Committee.*

FROM THE PRESIDENT.

OUR Director-general is planning to give, through the members of the League, free dental service to such families of soldiers, sailors, and marines as shall be found worthy by the Home Service department of the Red Cross.

This is a most commendable activity of the League, and should be supported by its entire membership. Only necessary service will be rendered, with special reference to children and expectant mothers, who will doubtless make up the greater percentage of cases requiring treatment.

It is possible that some members of the League may not be in full accord with this plan, but to such I would say that we have thus far undertaken no more necessary nor worthy activity. Suppose that you were in the trenches more than three thousand miles away from your wife and your children, who were left without sufficient support, suffering far more than yourself, in patience and silence. Would you not be cheered and thankful to know that skilled dentists stand ready to give them the best service within your power? Would it not fill your heart with thanksgiving, and make your cross easier to bear?

Then, for the sake of your conscience, your love of your own flesh and blood, do not advance a single argument against this great work, but add it to your already overburdened duties, and the blessings of real sacrifice will be yours throughout your lifetime. It is far better to sacrifice than to regret. Now is the time when every ounce of skilled energy must be utilized to the glory of our flag, our profession, and humanity. All true Americans are learning to give and to sacrifice, and surely no more worthy objects can be found than the wives and children of the men who are making the supreme sacrifice that our beloved country may remain clean and fit for the living as well as for the myriads yet to be born.

THE RED CROSS AND THE DENTAL MOTOR CAR.

The Red Cross will accept and ship to France all dental motor cars turned over to the Government by the League, and promises that they will be used for care of the soldiers only. With this assurance the League is ready to begin active work in supplying them as rapidly as possible.

Members of the dental corps in France are anxiously awaiting their arrival, and we have many letters urging us to get the cars over there, as there is the greatest need for them. Commanding officers have promised co-operation, and it is now up to the League to supply the demand. Fifteen cars have been completed, some of which were ordered by the Italian Government for child welfare service. No development has created greater interest in our profession, especially by the public, than our dental motor car.

Let every organized body of dentists plan immediately to raise money for this purpose, and I suggest that the officers write Dr. S. Marshall Weaver, Chairman, 620 Rose Bldg., Cleveland, Ohio, for full instructions.

This matter is vital, therefore urgent.

OUR INSTRUCTION COURSE.

Conditions generally in the educational department of our profession have been so unsettled while undergoing the changes subsequent upon militarizing dental institutions that those in charge of arranging a course of instruction in war oral and dental surgery have been unable to make definite arrangements in this most essential matter.

In the meantime, data are being compiled,

plans formulated, and co-operation of instructors gained, so that when the word is given to proceed we will be ready for action. The situation has worried your President greatly, as he has endeavored to establish a reputation for the League of accomplishing every good object undertaken, and it is no idle assurance to say that we are on the job to see this object a big success.

RECLAIM.

Colonel Logan asks all League members to reclaim men dentally defective and put them in class 1 A. We will back him up in this, and do our bit to make an army of five millions. *The war is not yet won.*

J. W. Beach, *President.*

AMERICAN RED CROSS DENTAL AMBULANCES.

And now they are utilizing dental ambulances in France, that American soldiers may have healthy mouths, with consequent good digestion and health. The first two of these dental ambulances on record were equipped through the efforts of Mrs. William Boyce Thompson, and given through the American Red Cross to the dental department of the United States Army.

These ambulances have all the appurtenances of the modern dental office, with the added advantage of being able to visit the patient in all sorts of out-of-the-way places. They consist of a main operating room and two good-sized tents. Every contrivance approved by the dental profession is installed in the ambulance.

In the center room, or office proper, is a complete dental outfit, with separate bracket for instruments, electric engine, fountain cuspidor, pressure tank with syringe and sprays, hot and cold water faucets, steam sterilizer, filter, vulcanizer, electric lathe, blow-pipe, nitrous oxid and oxygen apparatus, sanitary cabinet for instruments, a full set of forceps, and duplicate sets of instruments. There is even a typewriter for office record use.

The car is lighted by electricity generated by batteries especially built for the ambulance. Should they fail, provision is made for acetylene gas lighting.

When the car is in transit a field outfit, which closes up in three containers, is stored in the office. This is set up as soon as the car is ready for service. On either side of the office is a tent, one used for the field outfit; the other is converted into sleeping quarters, or it may be used as an adjunct operating room.

While dental treatment is being given in the office, one of the tents may be used for the more difficult operations. The car is manned by a crew of two officers, two dental assistants, and a chauffeur. In hot weather the sides of the tent may be rolled up, insuring all possible ventilation.

One of these ambulances is in active service at Camp Upton, the other at Camp Greenleaf. In all camps, newly arrived draftees carry with them trifling ailments—measles, mumps, and the like. The men are quarantined and as they cannot go to the dentist, the dental office honks up to them.

Camp Meade also has a dental ambulance, the gift of the Cleveland Unit of the Preparedness League. The Connecticut Unit provided funds for another which is going to France to serve our boys at the front. The Red Cross has thirteen of the dental ambulances, either completed or in process of construction. Three of them are for service in France and the other ten (three dental ambulances and seven baby-saving trucks) are on their way to Italy. All thirteen will go "over there." The Red Cross considers that the work among the babies and children of the war-swept lands will do much to rehabilitate future generations.

In order to continue this work and to provide for the greatly increased number of men who are being sent overseas monthly, the Red Cross will need the united support of the American people, that its mission of mercy and humanity may not be halted. For that reason the Red Cross will hold its second annual Christmas roll-call during the week of December 16th to 23d, when, it is hoped, every American man, woman, and child will place his or her name upon the Red Cross roster. Last year 22,000,000 adults and 8,000,000 children responded to the call, and took a nation-wide pledge to stand squarely behind the flag in our war for justice and liberty for all.

The above paragraphs, under the heading, "American Red Cross Dental Ambulances" is matter which has been received direct from the publicity bureau of the Eastern department of the Red Cross. It is therefore authentic. All League officers are requested to have this published in their local newspapers during the next Red Cross drive, which will begin December 16th.

Army and Navy Dental News

Examination for Army Dentists.

An examination will be held throughout the country on November 4th for appointment to the army dental corps. Approximately seventy vacancies are to be filled. An examination of privates of the army who are graduate dentists will be held within the next thirty to ninety days. Some of these men are already in the dental corps, but many of them are performing regular military duty in the various arms of the service. Their names have been assembled from the registration cards of the national army, and it is estimated that about four hundred in all are eligible to take this examination. These men will be given the first opportunity to fill vacancies, and those members of the former dental reserve corps, now in an inactive status, will be called to active duty as needed, probably after January 1st. Under the orders now in force, no men are issued commissions except as vacancies occur and their services are needed.—*Army and Navy Register.*

Naval Dental Corps.

On November 11th will be held an examination of candidates for appointment to the regular dental corps of the navy. This examination, which will be held simultaneously at Washington, at Great Lakes, Ill., and Mare Island, Cal., is for the purpose of filling fifty-six vacancies, and will be open to dentists between twenty-one and thirty-two years of age, provided they are not in class 1 of the draft; only men in deferred classifications will be considered. On October 14th an examination will be held for promotion of dental officers, and also for the appointment of those who have been in a probationary status. As a result of this examination, it will be possible to advance thirty dental surgeons to the grade of lieutenant, twenty-eight of whom may be promoted to the temporary grade of lieutenant-commander. This examination will be competitive, since the candidates are now serving a probationary period, and have no seniority. After qualifying in the forthcoming examination they will be assigned a place in the register. A training school for the naval dental corps has been established at the training station, Great Lakes, Ill., with Lieut.-commander Anson F. McCreary, dental corps, in charge, for the benefit of young officers of that corps. The course will comprise both military training and professional instruction. The course, for the present at least, will be open only to those who have been commissioned. The old dental reserve corps passed out of existence with the appropriation action of July 1st, and was superseded by the dental reserve force, members of the former corps having been required to enroll in the reserve force before being assigned to active duty. The age limit in the dental reserve is twenty-one to forty-nine.—*Army and Navy Register.*

Surgeon-general Merritte W. Ireland.

On October 3d the President sent to the Senate the following nomination: "To be Surgeon-general with the rank of Major-general: Major-General Merritte W. Ireland, M.C., U. S. Army." It may be taken for granted that this nomination will be confirmed by the Senate. The appointment of General Ireland to this position will give general satisfaction to the Medical department of the army. The record of General Ireland in the department is a record of thorough, conscientious service, fitting him particularly for the position which he now is to occupy.

General Ireland was born at Columbia City, Ind., May 31, 1867. He was graduated from the Detroit College of Medicine in 1890, and later, in 1891, was graduated from Jefferson Medical College, Philadelphia, immediately afterward entering the service as first lieutenant and assistant surgeon. He began his military career at Jefferson Barracks, Mo., on May 27, 1891. In 1902 he entered the Surgeon-general's office, working under Surgeon-general O'Reilly and continuing under Surgeon-general Torney. He was promoted to major and surgeon, and to major, M.C., August 3, 1903, and to lieutenant-colonel May 1, 1911. He left the office of the Surgeon-general in 1912, again going to the Philippines, where he was stationed as post surgeon at Fort William McKinley. He thus had a

continuous service in the Surgeon-general's office of approximately ten years. He returned to the United States and was placed in charge of the base hospital at Fort Sam Houston in 1916, and accompanied General Pershing to Mexico as surgeon of the American Expeditionary Forces to Mexico. When the United States entered the great war he accompanied General Pershing to France as chief surgeon of the American Expeditionary Forces, was promoted to the rank of brigadier-general, May 1, 1918, and more recently to the rank of major-general and surgeon-general of the expeditionary forces.

Our new surgeon-general has filled practically every position to which the men who will serve under him may be called—surgeon of volunteers, post surgeon, assistant in the Surgeon-general's office, supply depot, surgeon-general of the expeditionary forces—a complete record which indicates that the chief will know what confronts each of his subordinates.—*Journ. A. M. A.*

Inquiry Relative to Army Dental Corps.

Representative McKeown proposes in H. Res. 430, that the Secretary of War report to the House of Representatives the number of dentists commissioned in the dental corps of the army to September 1, 1918, together with the number of dentists who are members of the National Dental Association to whom commissions have been issued, together with the number of dentists who are non-members of any association to whom commissions have been granted, and are in the active service.—*Army and Navy Register.*

Promotions.

ARMY DENTAL CORPS.

The following appointments (promotions) are announced (September 21st):

To be Captains—for existing emergency: 1st Lieuts. Roy H. Kernohan, Harry L. Westney, Wm. H. Delbridge, James W. Simpson, James B. Eastman, Archibald R. Lucas, George A. Bullard, Edmund U. Potter, Page P. A. Chesser, Harold M. Whitney, and Henry H. Thacker.

Announced September 28th:

To be Captains—for existing emergency: 1st Lieuts. Lawrence K. Anderson, Leslie D. Baskin, Charles H. Brammell, George Krakow, Harry E. Smalley, Francis M. Tench, Richard K. Thompson, Wm. C. Webb, Jr., Theodore D. Grannick, Julius Seamans, Arthur T. MacMillan, and Clark J. Hollister.

Announced October 6th:

To be Lieut.-cols.: John A. McAllister, Jr., George H. Casaday and Julien R. Bernheim.

To be Majors: Mortimer Sanderson (deceased), John H. Snapp, Wm. A. Squires, Arnett P. Matthews, John W. Scovel, and Charles DeW. Deyton.

To be Major—for existing emergency: Capt. Clinton C. Messner.

To be Captains—1st Lieuts. Millard F. Stembridge, Angus M. Sellers, Theodore J. Richardson, Alva L. Cowart, Richard F. Doran, Frederick L. Litty, Jonas H. Stewart, Roy D. Smiley, Rozelle M. Cope, Louis T. Austin, Hugh D. Conlon, Wm. A. Duffy, Nelson T. Shields, Jr., Ernest P. Shaw, Walter B. Reeves, James M. Ackley, Roy White, LeRoy D. Shafer, and Charles Van B. Beard.

Announced October 12th:

To be Major—for existing emergency: 1st Lieut. Reuel May.

To be Captains—for existing emergency: 1st Lieuts. Rudolphe T. Turcotte, Emil L. Aison, Joseph A. Ahern, Victor A. Vores, Robert J. Steedman, Theodore C. Swendsen, Clarence S. Lister, John H. Malony, Moses C. Beal, Hurst V. Boyd, Matthew F. Carney, Lawrence T. DeVine, Dudley C. Hughes, O'Gorman J. Lane, Willis R. McCorshery, Edward L. Masten, Frank W. Meeske, Joseph F. Mulcahy, Elmer E. Purington, Harry E. Rice, Francis P. Riggs, Arthur C. Webb, Herman R. Moore, Walter W. Gochenour, and Robert E. Giddens.

Assignments.

ARMY DENTAL CORPS.

Week ending September 21st.

Col. Wm. H. Chambers from duty at general hospital 6, Fort McPherson, Ga., to Charleston, S. C., for duty as department dental surgeon.

Week ending October 5th.

The following from duty in Hawaiian Department to San Francisco, Cal., for orders: Majs. Harry M. Deiber, Walter L. Reesman, Oscar G. Skelton, and Emmett P. Varvel.

The following from duty in Philippine Department to San Francisco, Cal., for orders: Majs. Eugene Milburn, Don G. Moore, Harry C. Peavey, Charles Taintor, Robert B. Tobias, and Lowell B. Wright.

Week ending October 12th.

Lieut.-col. George I. Gunckel to report to retiring board at Washington for examination.

SPECIAL NOTICE.

PLATINUM — IRIDIUM — PALLADIUM.

GOVERNMENT REGULATIONS "LIMITING THE SALE, POSSESSION, AND USE OF THESE METALS AND COMPOUNDS THEREOF."

We have been requested by the War Industries Board (Platinum Section) to give publicity to the official form of certificate required from all (dentists) purchasers of "Platinum, Iridium, and Palladium or compounds thereof" by dealers operating under License Form 10x, issued by the Director of Mines, through the War Industries Board, which limits the purchase, possession, and sale of dental supplies containing these metals. The form follows:

Platinum Certificate.

To.....(*Dealer's name*).

I, the undersigned, hereby certify that I do not possess one ounce troy, or more, of unmanufactured Platinum, Iridium, or Palladium, or compounds thereof (including crude, scrap, filings, polishings, or sweeps), and will not possess dental supplies (excepting artificial teeth) containing Platinum, Iridium, and Palladium, or compounds thereof, in excess of my known requirements for thirty days.

[Signed].....(*Purchaser*).

Date.....

The following extracts from the Rules and Regulations under the Act of Congress of October 6, 1917 (40 Stat. 385) as amended by the Act of July 1, 1918 (Pub. 181) limiting the sale, possession, and use of Platinum, Iridium, and Palladium, and compounds thereof, apply particularly to users of and dealers in dental supplies containing these metals.

Regulations.

Section 1. The War Industries Board is hereby designated, under section 21 of the Act of October 6, 1917, and the President's proclamation of October 26, 1917, as the agent of the Director of the Bureau of Mines in the execution of the regulations as hereinafter indicated.

Sec. III. From and after the date of these regulations, under the penalties prescribed by section 19 of the Act of October 6, 1917, no person shall without a license—

Par. a: Purchase, sell, barter, or deal in unmanufactured platinum, iridium, or palladium, or compounds thereof (including crude, scrap, filings, polishings, or sweeps), except that sales may be made without a license to an authorized agent of the United States or

to a licensee authorized to purchase the same; or possess for more than 90 days after the date of these regulations one ounce troy, or more, of such unmanufactured platinum, iridium, palladium, or compounds thereof.

Par. b: Possess, use, sell, purchase, or barter, for purposes connected with his business, platinum, iridium, palladium, or compounds thereof (except that sales may be made without license to an authorized agent of the United States, or to a licensee authorized to purchase the same), if such persons be engaged in—

No. 10: Manufacturing and/or distributing dental supplies containing platinum, iridium, or palladium, or compounds thereof.

SEC. IV. Application for licenses shall be made under oath to any licensing agent duly authorized under the Act of October 6, 1917, as provided in the regulations issued under this Act.

SEC. V. Every applicant for a license will be required to submit with his application a sworn inventory of all platinum, iridium, or palladium, or compounds thereof, in his possession or control; and every licensee will be required to submit at such times as may be designated by the War Industries Board a sworn inventory of his holdings of platinum, iridium, or palladium, or compounds thereof, in whatever form they may be.

The Director of the Bureau of Mines, at the request of the War Industries Board, may at any time require from any user or possessor a detailed sworn inventory of any and all materials held by him containing platinum, iridium, palladium, or compounds thereof, and such inventory must be furnished promptly upon receipt of such requirement.

SEC. VI. All licenses shall be issued in the name of the Director of the Bureau of Mines and countersigned and delivered by the War Industries Board, and shall be and remain subject to the following conditions:

Par. a: Each license shall contain such appropriate conditions as the Bureau of Mines, through the War Industries Board, may impose.

Par. b: The Bureau of Mines through the War Industries Board may change the conditions of the license from time to time, as it may deem necessary.

Par. c: Records shall be kept by each licensee of all his sales, purchases, and other transfers of platinum, iridium, or palladium, or compounds thereof, and of articles containing platinum, iridium, or palladium, or compounds thereof, with the names and addresses of the purchasers, sellers and/or transferees, and the quantities involved, which records shall be open at all reasonable times to the duly authorized representative of the Director of the Bureau of Mines.

Par. d: Any and all platinum, iridium, or palladium, or compounds thereof, acquired under the authority of such license, shall be used strictly for the purposes and in the manner stated in such license.

Par. e: Upon request of the War Industries Board, the licensee shall report the prices at which sales of his products containing platinum, iridium, or palladium, or compounds thereof, are being made, and the right to prohibit further sale of such articles at prices deemed exorbitant by it is reserved to the War Industries Board.

SEC. VII. Any licenses issued hereunder may be revoked for violation of any of these regulations, or for violation of any of the conditions contained in such license, or if such revocation is deemed necessary or advisable for purposes of the national security and common defense.

SEC. VIII. The War Industries Board will, upon request, furnish a list of Government agents or licensees authorized to purchase platinum, iridium, or palladium, or compounds thereof. Neither the United States nor its representatives will assume any responsibility, financial or otherwise, where sales are made to licensees.

SEC. IX. The prices at which platinum, iridium, or palladium will be purchased by a duly authorized agent of the United States, or by such licensee as may be authorized to purchase or sell platinum, iridium, or palladium, or compounds thereof, will be such prices as may be determined by the proper governmental agency authorized to determine such prices.

SEC. X. Whenever such Government agents and such licensees as may be authorized to purchase platinum, iridium, or palladium, or compounds thereof, shall refuse to purchase the same from any person who is compelled by these regulations to sell the same, or is forbidden by these regulations to possess or use the same, then such person shall promptly notify the Platinum Section, War Industries Board, Washington, D. C.

SEC. XI. These regulations shall not operate to relieve any person upon whom an order requisitioning platinum, iridium, or palladium, or compounds thereof, may have been or may hereafter be served, from any obligation imposed upon him by such order.

Penalty.

SECTION 19 OF THE ACT OF OCTOBER 6, 1917:

That any person violating any of the provisions of this Act, or any rules or regulations made thereunder, shall be guilty of a misdemeanor, and shall be punished by a fine of not more than $5000 or by imprisonment for not more than one year, or by both such fine and imprisonment.

License Classifications

AFFECTING DEALERS IN OR USERS OF DENTAL SUPPLIES CONTAINING PLATINUM, IRIDIUM, AND PALLADIUM, AND/OR COMPOUNDS THEREOF.

No. 4: To purchase in any form which requires refining or smelting, and to possess for a reasonable time, the platinum, iridium, and palladium produced as a primary product or as a by-product of the smelting or refining. (See Section III, par. a, of Rules and Regulations regarding sale.)

No. 10-x: To purchase and possess and to sell to dentists (upon their certification that they will not possess more than a 30-day requirement, excepting artificial teeth), dental supplies containing platinum, iridium, and palladium, and/or compounds thereof.

(*a*) To purchase and possess in an amount equivalent to their known 30-day requirements, and to sell to dentists (upon their certification that they will not possess more than a 30-day requirement, excepting artificial teeth) dental supplies containing platinum, iridium, and palladium, and/or compounds thereof.

(*b*) To purchase and possess in an amount equivalent to their known 60-day requirements and to sell to dentists (upon their certification that they will not possess more than a 60-day requirement, excepting artificial teeth) dental supplies containing platinum, iridium, and palladium, and/or compounds thereof.

(*c*) To purchase and possess in an amount equivalent to their known 90-day requirements and to sell to dentists (upon their certification that they will not possess more than a 90-day requirement, excepting artificial teeth) dental supplies containing platinum, iridium, and palladium, and/or compounds thereof.

No. 13: To purchase and possess scrap, filings, polishings, and sweeps containing platinum, iridium, or palladium for re-sale to the United States Government or to licensees authorized to purchase same.

All communications regarding applications, licenses, inventories, or other matters pertaining to these regulations should be addressed to

PLATINUM SECTION
WAR INDUSTRIES BOARD
WASHINGTON, D. C.

SOCIETY NOTES AND ANNOUNCEMENTS

Dental Protective Association.

THE annual meeting of the Dental Protective Association of the United States will be held at the Palmer House, State and Monroe sts., Chicago, on December 16th, at 4 P.M. Reports of officers will be presented, a board of directors elected, and such other business transacted as should come before the association. All members are urgently requested to be present.

J. G. REID, *President.*
J. P. BUCKLEY, *V.-pres. and Sec'y.*
D. M. GALLIE, *Treasurer.*

Ohio State Dental Society.

THE fifty-third annual meeting of the Ohio State Dental Society will be held in the Memorial Hall, Columbus, December 3, 4, and 5, 1918.

An excellent program of papers and clinics is assured, with some new features of special interest.

A cordial invitation is extended to members in good standing of other state societies to meet with us.

F. R. CHAPMAN, *Sec'y,*
305 Schultz Bldg., Columbus, Ohio.

Michigan Board of Examiners.

THE next meeting of the Michigan State Board of Dental Examiners will be held at the Dental College, University of Michigan, Ann Arbor, Mich., November 18 to 23, 1918, inclusive. Applications and other information may be obtained by addressing

B. S. SUTHERLAND, *Sec'y*,
Owosso, Mich.

Rhode Island Board of Registration.

THE semi-annual meeting of the Rhode Island Board of Registration in Dentistry, for the examination of candidates, will be held at the State-house, Providence, R. I., December 3, 4, and 5, 1918.

Applications with fee must be in the hands of the secretary one week previous.

For further information address

ERNEST A. CHARBONNEL, *Sec'y*,
139 Mathewson st., Providence, R. I.

Pennsylvania Board of Examiners.

THE next examination of the Pennsylvania Board of Dental Examiners will be held in Philadelphia and Pittsburgh, on Tuesday, Wednesday, Thursday, and Friday, December 3, 4, 5, and 6, 1918, at Musical Fund Hall in Philadelphia and the University of Pittsburgh, Pittsburgh. The practical examination will be held on Friday, December 6th, the last day. Application papers can be secured from the department of Public Instruction, Harrisburg.

For further information address

ALEXANDER H. REYNOLDS,
4630 Chester ave., Philadelphia, Pa.

New Jersey Board of Registration.

THE State Board of Registration and Examination in Dentistry of New Jersey will hold their annual meeting and examination in the Assembly chamber, at the State-house, Trenton, N. J., on December 2, 3, 4, 5, and 6, 1918. License fee, $25; re-examination fee, $10. Practical tests required: Insertion of an approximal gold filling, with approximating tooth in position, compound approximal amalgam filling, a silicate filling, practical test of the applicant's ability in oral prophylaxis, and preparation of a cavity for an inlay with wax pattern. Also the soldering of a bridge consisting of three or more teeth, exclusive of abutments, and one Richmond crown, which may be one of the abutments of the bridge; these must be made of gold or silver. The bridge must be struck from dies made from an impression of the mouth, and the articulating model, with the bridge, when soldered, must be submitted for inspection. An anatomical articulation of a full upper and lower set of teeth will also be required; teeth to be furnished by applicant. Wax bite properly trimmed and in place on models for inspection before setting up teeth.

Attention is directed to the following quotation from the dental law of New Jersey: "Applicant shall present to said board a certificate from the Commissioner of Education of this state, showing that before entering a dental college he or she had obtained an academic education consisting of a four-year course of study in an approved public or private high school, or the equivalent thereof." In accordance with this law the secretary will issue application blanks only upon presentation of the required certificate from the Commissioner of Education, State-house, Trenton, N. J.

Note.—Dental Radiography will be added to the list of theoretical examinations in June 1919.

Applications must be filed complete ten days before the date of the examinations. Address all communications for further particulars to

JOHN C. FORSYTH, *Sec'y*,
430 E. State st., Trenton, N. J.

Washington Board of Examiners.

THE next meeting of the Washington State Board of Dental Examiners will be held in Spokane, Wash., November 20 to 25, 1918.

FRANK B. LYNOTT, *Sec'y*,
Spokane, Wash.

Montana Board of Examiners.

OWING to the present war conditions and the lack of a sufficient number of applicants, the Montana Board of Dental Examiners will *not* hold the usual January examinations. The next examinations will be held at Helena, Mont., on July 14, 15, 16, and 17, 1919.

T. M. HAMPTON, *Sec'y*,
Helena, Mont.

Oklahoma Board of Examiners.

THE Oklahoma Board of Dental Examiners will hold their next regular semi-annual meeting at the State Capitol building, Oklahoma City, Okla., beginning December 9, 1918. Reciprocity only with Kansas, Missouri, Arkansas, Nebraska, Indiana, and District of Columbia.

For further information address

H. OVERBEY, *Sec'y*,
Ryan, Okla.

California Board of Examiners.

THE next meeting of the Board of Dental Examiners for the purpose of examining applicants for a license to practice dentistry in the State of California will be held in the City of San Francisco at the Dental College, University of California, beginning on December 9, 1918. All applications for examination must be filed with the board on December 9th at 9 A.M. Each application must be accompanied by (1) the fee of $25; (2) diploma and license from other states; (3) diploma from an accredited high school giving a four-year course of instruction or a certificate signed by a state superintendent of public instruction (or similar officer) to the effect that such applicant has had scholastic preparation in all respects equivalent to that demanded for graduation from an accredited high school giving a four-year course of instruction, in the state from which such certificate is issued; in lieu of such high-school diploma or certificate, an applicant who has been licensed in some other state of the United States for a period of at least five years may file his state license; (4) a testimonial of good moral character; (5) a recent unmounted photograph.

By order of the Board of Dental Examiners of California.

C. A. HERRICK, *Sec'y*,
133 Geary st., San Francisco, Cal.

Connecticut Dental Commission.

THE Dental Commissioners of Connecticut will meet at Hartford, November 21, 22, and 23, 1918, to examine applicants for license to practice dentistry, to examine dental hygienists for license to practice, and to transact any other business proper to come before them.

For blanks and further information, address

EDWARD EBERLE, *Recorder*,
902 Main st., Hartford, Conn.

Maryland Board of Examiners.

THE Maryland State Board of Dental Examiners will meet for examination of candidates for certificates on November 7 and 8, 1918, at the Baltimore College of Dental Surgery, Baltimore, Md., at 9 A.M.

For application blanks or further information apply to

F. F. DREW, *Sec'y*,
701 N. Howard st., Baltimore, Md.

UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING AUGUST 1918.

August 6.

No. 1,274,423, to NICHOLAS A. KRISTMANN. Dental floss case.

August 13.

No. 1,275,275, to SAMUEL LEVINSON. Mouth toilet preparation.

No. 1,275,590, to WILLIAM M. NORWOOD. Dental plate.

No. 1,275,779 to WILLIAM F. SPIES. Dentifrice and method of making the same.

August 27.

No. 1,277,020, to LUTHER A. YOUNG. Dental disk and holder.

No. 1,277,245, to F. L. MURDOCK. Artificial denture.

THE

DENTAL COSMOS

VOL. LX. DECEMBER 1918. No. 12

ORIGINAL COMMUNICATIONS

Sterilization of Root-canals.

By HERMANN PRINZ, D.D.S., M.D., Philadelphia, Pa.

From the Pharmacological Laboratory, Thomas W. Evans Museum and Dental Institute, University of Pennsylvania.

[SECOND PAPER.]

INTRODUCTION.

IN a previous paper (DENTAL COSMOS, April 1917) the writer presented certain experimental data concerning the various methods involved in the process of electro-sterilization of infected root-canals. This procedure, from a clinical viewpoint, has been eminently successful; it presented, as the Editor of the DENTAL COSMOS expressed it, "a method of root-canal sterilization based upon scientific and clinical investigation that apparently brings the question of root-canal sterilization within the sphere of mathematical precision."

At the outset the writer wishes to state that every word he has uttered about electro-sterilization of root-canals still holds good today, and that he does not retract one iota from his previous statements. The reader may be justified in asking this question: Why, then, this apparent paradox in recommending a new method, if the first method was successful? The perusal of the following lines, it is to be hoped, will quickly convince the inquirer that the new method in its final analysis is merely a simplification of the original method as discussed in the first paper, *i.e.* the utilization of chlorin as a disinfecting agent for the purpose in view.

During electro-sterilization, chlorin is obtained by a process of ionization of a sodium chlorid solution which requires an expensive apparatus, a knowledge of physical chemistry not possessed by the average dental practitioner, and an expenditure of valuable time. Especially the latter item is of the utmost importance to the busy clinician. The proper utilization of time constitutes the most important economic factor in the exer-

cise of any calling. Hence when a method promises to assist in the curtailment of time expenditure while producing equally good results as another given method, it is deserving of earnest consideration by the clinical practitioner.

The agent which the writer here wishes to discuss, and which he employs for the purpose of furnishing available chlorin, is a new compound known as dichloramin-T. This compound was selected by Dr. H. D. Dakin for the purpose of sterilizing infected war wounds. The testing of its surgical value was entrusted to Dr. Walter E. Lee of the Pennsylvania Hospital of Philadelphia and Dr. Joshua E. Sweet, professor of surgical research, University of Pennsylvania (now in France). Captain Sweet was kind enough to entrust the testing of this preparation, in regard to its value in dental practice, to the writer, who is also under much obligation to Dr. Lee for data concerning the general surgical technique, literature, etc. Following Dr. Dakin's instructions, dichloramin-T and its solvents were first prepared by Dr. B. M. Hendrix of the department of physiologic chemistry, University of Pennsylvania. The writer is deeply indebted to these gentlemen for numerous courteous acts.

HISTORY.

From an historical point of view it is interesting to observe that chlorin in the form of its numerous preparations has had a rather checkered career within that group of substances generically referred to as disinfectants and antiseptics. In 1788, the French chemist Berthollet obtained a liquid which exhibited marked bleaching and disinfecting properties, and Tennant of Glasgow, in 1798, prepared a more stable compound in the form of chlorinated lime for similar purposes.

In 1792, the Javelle works, near Paris, prepared a liquid bleaching compound for commercial purposes by passing chlorin into potash solution, which since has become widely known as Eau de Javelle or Javelle water. Again, in 1820, Labarraque, a French pharmacist, modified this latter solution by substituting sodium carbonate for the potash salt. This solution, variously known as liqueur de Labarraque, as Labarraque's disinfectant fluid, or at present simply as Labarraque's solution, achieved great renown at the death of Louis XVIII, "for, thanks to the disinfecting and deodorizing values of his liqueur Labarraque was able to proceed with the embalming of the royal body, which was so profoundly decomposed that no one was able to approach it until after the application of the hypochlorite solution." (Dakin.)

When Semmelweiss, the assistant obstetrician of the Vienna lying-in hospital announced, in 1846, his epoch-making observation concerning the clinical causes of puerperal fever, he selected chlorinated lime solution as the agent *par excellence* for the destruction of that loathsome unknown "miasm" which was carried by the students, as he observed it, from the dissecting rooms to his wards, and which was the apparent cause of the scourge.

Again, during the civil war, chlorinated lime solutions were occasionally employed to check the frightful destruction of human life by hospital gangrene. However, principally on account of the caustic effect of the solutions employed, together with a faulty technique in its application, the compound never obtained the general usefulness which it rightly deserved. With the advent of modern bacteriology, chlorin has always been a favorite antiseptic in the hands of the experimental researcher, and within the province of the hygienist its application for the purification of drinking water and the sterilization of excreta it has achieved most remarkable results, and consequently it is at present very largely employed for such purposes.

Repeated attempts have been made in the past by bacteriologists to convince clinical surgeons and dentists that chlorin solutions are the acme of perfection as far as wound antiseptics are concerned. As a consequence, various preparations under more or less fanciful names have appeared on the market, among which Labarraque's solution, Ja-

velle water, electrozone, dental meditrina, radizin, antiformin, eusol, eupad, chlorazene, and many others are examples. All of these solutions show remarkable activities as far as their laboratory tests are concerned; nevertheless, in their practical application they do not produce the same satisfactory results, and hence they have proved disappointing to the clinician. It should be borne in mind that most of these preparations are strong irritants, and that chlorin solutions are rather labile compounds; all of the solutions named lose their activity within a week or two, hence the disappointing results when commercial stock preparations are employed.

PHARMACOLOGY OF DICHLORAMIN-T.

The halogens represent the most interesting and incidentally the most important group of those chemical substances which as a class are referred to as wound antiseptics and as general disinfectants. On account of their general behavior bromin and fluorin are of less importance for such purposes, while iodin and chlorin, because of their high efficiency and their universal adaptability from a clinical point of view, form the most important group among these substances.

At this moment chlorin is considered king among the chemical disinfectants; when freshly prepared, in the presence of moisture and a suitable temperature, it is *the* most active disinfectant known. From a technical point of view, however, numerous difficulties arise in its application which in the past have more or less interfered with its universal application. Chlorin as such is a gas which, while it may be readily compressed into a liquid, cannot be employed as such with any degree of satisfaction for wound treatment, as it is too irritating. Suitable solutions prepared from the liquefied gas, a process which at present is very much simplified, possess necessarily all the drawbacks of an aqueous solution.

The usual solutions which have been most widely employed are Labarraque's solution, *i.e.* a solution of chlorinated soda, and Javelle water. These two solutions, however, possess also serious drawbacks as far as their clinical application is concerned. They readily deteriorate, and, incidentally, they macerate the epidermis when kept in contact therewith even for a short time only, so as to render them practically not only useless but directly dangerous for the purpose for which they are intended.

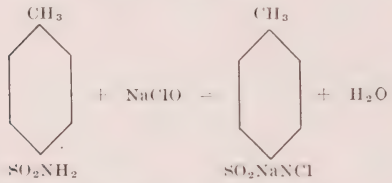
Dakin in his studies of the antiseptic properties of the hypochlorite of soda solution finally succeeded in preparing a compound which is practically neutral and which incidentally contains only about $\frac{1}{2}$ per cent. of the hypochlorite salt. This solution produces virtually no irritating action on the skin and wound surfaces, and it is the compound which at present, according to the Carrel-Dehelly-Depage technique, is employed in the treatment of war wounds. Without entering into a discussion of the complicated and time-consuming technique of the above method as utilized in general surgery, it suffices to say that the method as well as the solution employed is practically useless for the treatment of infected root-canals.

Dakin soon realized the clinical drawbacks possessed by the various solutions of chlorinated soda, and his further studies led him to utilize certain synthetic chlorin compounds discovered by Chattaway, among which chloramin-T and dichloramin-T are the two most important representatives. Chloramin-T, being water-soluble, possesses more or less the same disadvantages as any other aqueous solution of chlorin. The permanence of such solutions is very limited, and, further, they are very quickly exhausted by wound secretions. On the other hand, dichloramin-T, a substance soluble in an oily medium, furnishes a veritable reservoir for the slow elimination of chlorin which preserves its activity for many hours in the presence of wound exudates. It is this latter substance which, upon the recommendation of Captain Sweet, we selected from the various chlorin compounds for our experimental work, and the results ob-

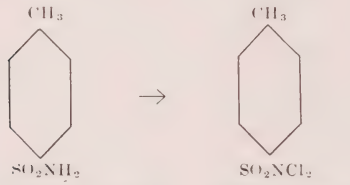
tained therewith merely verified the praiseworthy reports published by Dr. W. E. Lee and his numerous co-workers.

Dichloramin-T is the abbreviated name of para-toluene-sulfone-dichloramid, $CH_3C_6H_4SO_2NCl_2$. (The letter T, indicating toluene, distinguishes it from similar compounds which have been or may be made from benzene, xylene, etc.)

Graphic formula.



Toluene-para-sulfonamid. Chloramin-T.



Toluene-para-sulfonamid. Dichloramin-T

It is a yellowish-white crystalline powder, having a sweetish, rather pungent chlorous odor and containing a little over 29 per cent. of available chlorin. It melts at about 80° C. (176° F.). In the solid state, when kept in the dark it is stable. It is practically insoluble in water, but is readily soluble in most organic solvents, *i.e.* chloroform, benzene, eucalyptol, etc. It quickly reacts, undergoing decomposition with evolution of nascent chlorin when brought into contact with most organic substances, such as acids, alcohol, and the amins, with hydrogen dioxid, water, etc., and certain metals. It should be stored in small amber-colored glass-stoppered bottles and protected from heat.

The strength of dichloramin-T or its solutions may be readily estimated by taking an aliquot quantity, *i.e.* 0.1 gram of dry dichloramin-T or 0.5 gram of its solution and adding 5 cc. of carbon tetrachlorid and an excess of a 10 per cent. potassium iodid solution and glacial acetic acid. The liberated iodin is titrated with N/10 sodium thiosulfate solution. Each cc. of the thiosulfate solution is equal to 6 milligrams of dichloramin-T. A strong odor of chlorin and incomplete solubility in chloroform are reliable signs of decomposition of the salt, while extreme turbidity and the formation of crystals in the bottom of the bottle are an indication of the decomposition of its solution in chlorcosane.

The bactericidal action of dichloramin-T is discussed under the heading of "General action of antiseptics."

SOLVENTS FOR DICHLORAMIN-T.

At the early stages of our experimental work we prepared the dichloramin-T solution in accordance with the original suggestion of Dakin, by using such solvents as chlorinated eucalyptol and chlorinated paraffin oil, or a mixture of both. However, it was observed that these solutions produced varying degrees of pain, which we attributed to the irritating effects of the solvents. Chlorinated eucalyptol is an unstable body which readily decomposes in the presence of dichloramin-T by absorbing moisture, resulting in the production of volatile acid substances. Hence, when Dakin announced that he had prepared a new solvent for his antiseptic which eliminated the above disadvantages of the original solvents, we at once tried out the preparation and found it to be fully in accordance with the claims made for it.

This new compound is known as "chlorcosane." It is a bland, heavy, viscid oil, having a slight yellowish color, and is prepared from hard paraffin melting at about 50° C. (122° F.) by replacing a part of its hydrogen by chlorin. Chlorcosane does not contain any "free" chlorin, although it absorbs from 45 to 55 per cent. of its own weight. The chlorin combines with the carbon of the paraffin somewhat in the same manner as chlorin and sodium combine to form the ordinary inert sodium chlorid. Chlorcosane, by the application of moderate

heat, will readily dissolve from 8 to 10 per cent. of dichloramin-T, which is more than amply sufficient for dental purposes. As the preparation is too cumbersome to be attempted by the dentist, chlorcosane, as well as dichloramin-T, is best procured through the ordinary trade channels.

PREPARATION OF DICHLORAMIN-T SOLUTION.

Regarding the concentration of the solution of dichloramin-T for the purpose of treating infected root-canals, we have found that a 5 per cent. solution of the salt in chlorinated paraffin, *i.e.* chlorcosane, answers our purpose quite satisfactorily. We have heard an opinion expressed to the effect that a 5 per cent. solution is too irritating when used in root-canal work. We cannot subscribe to such assertions: we rather believe that the pain resulting from its application was due to two causes—a spoiled solution and a faulty technique. Dr. Lee and his co-workers have employed a 5 per cent. solution in many thousands of cases by pouring quantities of a dram or more directly into an open wound without producing the slightest painful sensation. We can fully confirm these facts.

Solutions of dichloramin-T preserve their activity for a limited time only; they usually deteriorate within two or three months, and therefore it is best to prepare a convenient quantity which may be readily used up within a month or so. To prepare an ounce of the solution, 25 grains of dichloramin-T are placed in a dark amber-colored glass-stoppered bottle, which must be absolutely clean and free from moisture. One ounce of chlorcosane is added, the whole is thoroughly shaken, and the bottle is placed in a pan containing very hot water or upon a radiator or other source of indirect heat. Within a quarter of an hour complete solution usually results. Direct heat in making the solution is to be avoided, as it is liable to injure the compound. The solution is immediately ready for use; filtering is not necessary. As stated above, only dark amber-colored or black bottles should be employed as storage vessels; blue glass does not protect the solution against the actinic effects of strong light.

Solutions of dichloramin-T must be carefully protected against heat, light, water, alcohol, and most metals; in fact, most common substances have a strong affinity for chlorin, hence the ready decomposition of this solution when brought in contact therewith. Whenever the solution becomes turbid and forms a deposit of crystals in the bottom of the bottle, or develops a pronounced odor of hypochlorous acid, it should be discarded. Fresh solutions, if chilled, may temporarily become cloudy, or even precipitate, owing to the separation of either dichloramin-T or of solid paraffin. Slightly warming the solution quickly restores its usefulness.

Fig. 1.

Office-preparation bottle.

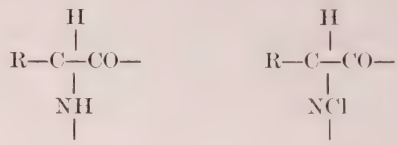
For office purposes, it is best to keep the dichloramin-T solution in an amber-colored office-preparation bottle with a ground cap. (Fig. 1.) A small glass rod or tube kept in the bottle readily assists in obtaining the few drops necessary for each treatment, to be placed upon an aseptic glass tray. Under no condition should pliers charged with cotton, etc., be introduced into the preparation in the bottle, and no unused portions of the solution must be returned to the stock-bottle.

GENERAL ACTION OF ANTISEPTICS WITH SPECIAL REFERENCE TO DICHLORAMIN-T.

The terminology of the substances which are used for the purpose of combating infection is frequently employed in a very loose manner, and without regard to its precise meaning. Hence, therefore, it may not be amiss to give as a preamble the definite significance of the more important terms as they are used to designate the specific nature of their action.

It is generally recognized at present that the breaking down of highly organized bodies is brought about by the activity of minute vegetable organisms—the bacteria. This process is known as putrefaction, or, under certain conditions, as fermentation. The presence of certain bacteria and their products is instrumental in the production of severe physiologic changes resulting in the various vital phenomena known as infectious diseases. The existence of a condition in which bacterial infection and its sequelæ are brought about by the presence of germs or their products is referred to as sepsis, while asepsis implies the entire freedom from such infection. If a primarily septic condition is changed by some method or means which inhibits the growth of the putrefactive organism, antisepsis is induced. Antiseptics, therefore, are chemical agents which merely inhibit the action and growth of bacteria, while germicides destroy the vitality of the infective organisms. Disinfectants also kill the bacteria, and incidentally chemically change their poisonous products to some inert compound. A disinfectant must, therefore, be a germicide, while an antiseptic is not necessarily a germicide nor a disinfectant.

According to Dakin and Dunham, the action of chlorin upon bacteria and their products seems to depend upon a process of chlorination, *i.e.* the amino acid groups of the proteins readily attack all substances containing "active" chlorin in such a way that the hydrogen attached to the nitrogen atom is replaced by chlorin. The newly formed compounds contain the NCl group, and therefore belong to the class of chloramins.



The chlorin of these newly linked compounds is still available, and these substances themselves are active germicides. A part of the liberated chlorin is used up by forming inert compounds, that is, chlorin unites with carbon to form inert chlorids. Incidentally, the liberated chlorin is a strong oxidizing (bleaching) agent which is a most beneficial factor in the treatment of pulpless teeth. Chlorin further acts as a prompt deodorizing agent, and possesses the additional remarkable property of digesting and removing sloughing necrotic tissue and of decomposing toxins.

Dichloramin-T shares with other chlorin compounds the property of being a very active lymphagogue, *i.e.* the amount of wound secretion, especially in the beginning of the treatment, may be considerably increased. The writer's attention has been frequently drawn to this fact by fellow practitioners who have tried the compound in treating root-canals, and who complained of the increased secretion from the canals—which, incidentally, influences the granulation of the wound most beneficially.

The application of the antiseptic principle as utilized in wound sterilization depends primarily upon three definite conditions:

(1) Absolute contact of the antiseptic with the infecting organism.

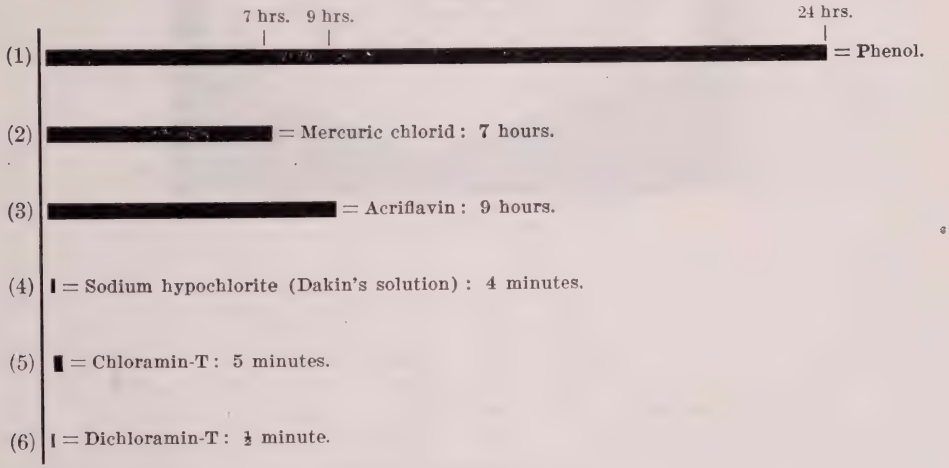
(2) Time during which this contact is maintained.

(3) Sufficient concentration of the antiseptic at the points of contact.

Absolute contact between the antiseptic agent and the substances to be acted upon must be rigidly observed, as no antiseptic is known to act at a distance. Consequently all dead tissue (in our particular instance, the débris of the

gangrenous pulp) must be mechanically removed. Regarding the factor of time, it must be understood that the action of the antiseptic is enormously influenced by the medium in which it is dispersed, *i.e.* a specific solution of one antiseptic may kill a given number of bacteria suspended in water very rapidly, while this same solution upon bacteria suspended in blood serum may be practically insignificant. The stability of an antiseptic as an inherent property is also of vital importance, since the innumerable changes which it undergoes during its action, such as decomposition, precipitation, absorption, etc., are of extremely wide variation. Dr. Dunham has very ingeniously depicted the speed of disinfection of a few widely used antiseptics in the following chart:

Fig. 2.



Speed of Disinfection.

A 2 per cent. solution of (1) Phenol failed to sterilize the mixture in 24 hours, although the surviving organisms were only two per thousand of those originally present. (2) Mercuric chlorid, 1 : 1000, accomplished the same degree of disinfection in three hours, and completely sterilized in seven hours. (3) Acriflavin, a dye recently introduced as an antiseptic, 3 : 1000, killed all the bacteria in about nine hours. (4) Sodium hypochlorite (Dakin's solution), 0.5 per cent., completely sterilized in four minutes. (5) Chloramin-T in five minutes. (6) Dichloramin-T, 2 per cent. in oil solution, in less than half a minute when well mixed with the septic material. (Dunham.)

Finally, the permissible concentration of an antiseptic depends largely upon the tolerance of the tissues with which it is brought in contact, and is usually obtained from clinical observation. The concentration of the antiseptic solution determines its mass action which can be safely employed for tissue sterilization.

Concerning the relative bactericidal properties of the dichloramin-T solution, Drs. Lee and Furness make the following comment:

> Theoretically, then, this new chlorin compound eliminated at the start the chief indication or necessity for the Carrel technique, skin irritation. With such a solution it should be possible to present to an infection an overwhelming mass of germicide, a 20 per cent. solution of dichloramin-T being approximately 80 times the germicidal mass of a 0.48 per cent. hypochlorite solution. There is a vital necessity, when using germicides in the treatment of infections, for the earliest possible application of an overwhelming mass of a rapidly acting agent, because infection develops in the tissues at the rate of a geometric progression, and not by the slow process of addition, and therefore every min-

ute counts in the end result. Dichloramin-T, with a phenol-oil coefficient of about 50, can be presented in a larger mass without injury to the tissue cells than any other germicide we have used. Instead of having this chlorin given up with explosive rapidity and the consequent necessity of frequent renewals of the solution, it would be slowly diffused into the surrounding media, making it unnecessary to renew the solution or to dress the wounds more frequently than once in every twenty-four hours.

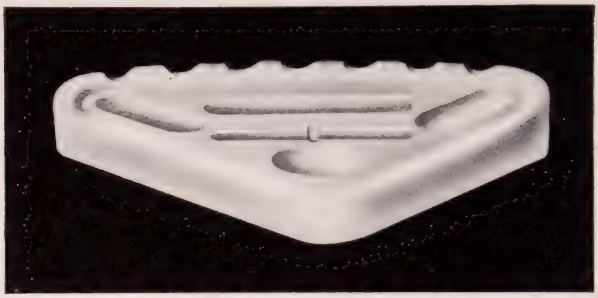
TECHNIQUE OF TREATMENT OF INFECTED ROOT-CANALS.

The treatment of an infected root-canal when viewed in the light of modern conservative dentistry resolves itself into three definite phases—the mechanical, the chemical, and the therapeutic procedure. If these various steps are carried out in regular sequence, definite results should be obtained within a very limited period of time, manifested as a cure, or, if negative, in subjecting the tooth to the last resort of treatment, a surgical operation. This latter procedure may consist in the removal of the diseased root-end by excision (root amputation) as described by the writer in a recent article,* or if the diagnosis does not favor such conservative procedures, in its radical cure—extraction of the tooth.

The mechanical procedures involved in the removal of the débris of a dead pulp are so well known that we are able to dispose of this phase of the treatment with a very few words. After the root-canal is thoroughly opened under aseptic precautions, a droplet of dichloramin-T is placed in the pulp chamber, and with sterile broaches and most careful manipulation its contents are removed. The sterile broaches are alternately dipped into dichloramin-T, slowly worked into the canal, and wiped on a piece of cheese-cloth or bibulous paper. Extreme care should be exercised to avoid forcing any of the gangrenous material beyond the foramen, otherwise a violent infection, which usually manifests itself within twenty-four hours in the form of an acute abscess, is sure to follow. If the operator is fortunate enough at the first sitting to reach the apical end of the canal, the subsequent treatment will be very much simplified, while if the reverse is true, the patient should be dismissed with a dressing of dichloramin-T sealed in the canal. If at the first sitting no attempt is made to remove the contents of the canal the latter should not be sealed, as there is always a possibility of renewed activity of the aerobic bacteria as a sequence of oxygen having entered into the canal, which results in the production of gas and subsequent pressure along the line of least resistance, namely, the apical foramen.

As a convenient means of holding the necessary drugs, sterilizing broaches, etc.,

FIG. 3.



Aseptic medicament tray.

* See DENTAL COSMOS for May 1918, page 381.

the writer has suggested an aseptic medicament tray, as shown in Fig. 3. The elongated depressions in the tray are filled with a mixture of four parts of alcohol and one part of glycerin, in which broaches, root-canal cleansers, etc., may be kept immersed while working on the tooth.

It must be borne in mind, however, that the mechanical removal of the débris of a decomposed pulp from a root-canal forms the most important procedure in its routine treatment. It is a gross fallacy to assume that neglect in this respect can be counterbalanced by the future use of antiseptics. To depend upon a chemical agent to perform that portion of the work which should be done by mechanical means, is a misinterpretation of the bactericidal action of antiseptics. At best, antiseptics are only accessories to, and not substitutes for, efficient mechanical procedures. In conformity with the laws governing the action of antiseptics it must be repeated that the antiseptic power of germicidal solutions is practically restricted to that portion of the root-canal with which they actually are brought in contact—at best a very superficial process—and no antiseptic seems to possess any considerable power of penetration without simultaneously losing its activity.

It should be an invariable rule with the operator to enter a root-canal only with absolutely sterile broaches, absorbent-paper or cotton points, etc. A convenient and simple sterilizer for absorbent points and gutta-percha points has been recently devised by the writer: A screw-cap bottle of about one ounce capacity is provided with a piece of thick cotton roll of about one inch in length (Fig. 4), which is fastened to the interior of the cap with sealing-wax. About five drops of dichloramin-T solution are placed upon the lower end of the roll, where they are quickly absorbed. The chlorin compound is renewed about once a month. The paper, cotton, or gutta-percha points are placed in the bottom of the dry bottle, the screw cap is put into position and the permanent sterilizer is completed. The efficiency of this simple device has been repeatedly tested by plating out the points; they have always been found to be absolutely sterile.

The chemical treatment of the infected root-canal, and incidentally its enlargement when obstructed, should invariably immediately follow as the second stage in the routine sequence. Schreier, in 1893, advocated an alloy of potassium and sodium (kalium-natrium) for such purposes, and the late Dr. John R. Callahan, in the same year, introduced the use of 50 per cent. sulfuric acid. The sulfuric acid method enjoys

Fig. 4.

a *b*

a, Paper-cone sterilizer. *b*, Gutta-percha point sterilizer.

at present a wide popularity, although other acids, *i.e.* 10 per cent. hydrochloric acid, pure nitro-hydrochloric acid (aqua regia), and phenol-sulfonic acid have been recommended. The therapeutic absurdity of the latter compound has been dealt with by the writer on a former occasion.*

Pure nitro-hydrochloric acid, as introduced by G. W. Weld in 1897, is the most efficient agent for the above purposes. On account of its strong caustic properties, extreme care is required in handling it. This acid should be preserved in glass-stoppered bottles and preferably kept outside of the operating

* See Dental Cosmos for April 1912, page 397.

room, as its fumes are most destructive to metallic instruments. It may be applied by means of a steel broach. Concentrated aqua regia has practically very little effect on steel, as the broach is at once covered by a protective oxid by the action of the evolved nitrosyl chlorid, which checks the further action of the acid upon the metal.

Whatever acid is employed should be neutralized by sodium dioxid, as recommended by Kirk in 1894, and not by sodium bicarbonate, which is practically useless for the above purposes. This agent is carried into the root-canal by means of a broach previously dipped into chloroform; the latter substance merely acts as an indifferent conveyer of the sodium dioxid to the root-canal, which, if water or ordinary alcohol is used, readily decomposes. The chemical interchange between the various acids may be portrayed by their respective reactions as follows:

$$H_2SO_4 + Na_2O_2 = Na_2SO_4 + H_2O_2$$

or $$2HCl + Na_2O_2 = 2NaCl + H_2O_2$$

or $$2HNO_3 + Na_2O_2 = 2NaNO_3 + H_2O_2 \quad \text{and}$$

$$2HCl + Na_2O_2 = 2NaC + H_2O_2 \quad \text{and}$$

$$H_2O_2 + 2HCl = 2H_2O + Cl_2$$

The evolution of nascent oxygen which follows as a sequence of the reaction between the sodium dioxid and any of the acids employed is an important factor in the chemical treatment of the root-canal, as it will materially assist in the preservation of the natural color of the tooth. Copious washing of the canal with water should be followed by the removal of moisture. Sterile paper points assisted by a few drops of acetone, hot air, or a heated silver wire are serviceable for this purpose. Overheating of the tooth must be carefully avoided; however, a fair dryness of the root-canal must be insisted upon, as otherwise the future treatment with dichloramin-T is materially impaired. A suitable paper point is now saturated with dichloramin-T, carried to the root-canal, and with a pumping motion an attempt is made to coat the walls of the latter, and if possible a droplet is forced into the periapical space. The use of the warm air blast is of material assistance in getting the oily solution into the finer ramifications of the canal. The warm air blast is recommended in this connection solely for its mechanical effect in aiding the diffusion of the dichloramin-T throughout the dentin, but its use as a means for previous desiccation of the canal walls is not admissible, for the reason that the natural moisture of the tooth structure is necessary to the production of nascent chlorin resulting from the reaction of the dichloramin-T with the water of the organic structure of the tooth.

A fresh point carrying a drop of the chlorin solution is now slowly forced into the canal to its very end and immediately sealed with a suitable retainer.

As we have stated above, close contact of the antiseptic solution with the walls of the root-canal, and if possible, with the surface of the involved infected area within the periapical tissues, is essential to obtain therapeutic results.

The first application remains undisturbed for twenty-four hours. At the return of the patient the point is removed aseptically and carefully examined, and if found discolored a second acid treatment is necessary.

The second dichloramin-T treatment placed in the dry canal, again remains twenty-four hours, while a third application is usually left in position for forty-eight hours. The paper cone removed at the last sitting must show no discoloration, it must have a distinct odor of chlorin, and it must be fairly free from absorbed exudates. Under no consideration should a first or second treatment be left in the canal over twenty-four hours; at the end of this time the chlorin compound is completely exhausted, and usually a pronounced flow of lymph, as referred to above, is the sequence. If at the last treatment the canal is found satisfactorily clean, no time should be lost in filling it at once.

In all cases in which the infection from the root-canal has passed into the periapical space, localized pathological disturbances arise which may lead to the formation of an alveolar abscess. The

content of the abscess cavity is usually forced to the surface along the lines of least resistance, *i.e.* either through the root-canal or through the bony wall of the alveolus and thereby establishing a fistula. In either case the treatment does not differ from the above-discussed principles.

In cases in which a fistula exists, an effort is made to establish a communication between the root-canal and the fistula proper by forcing normal saline solution through the fistula via the root-canal. Dichloramin-T solution is now pumped through the root-canal into the fistula until it appears at its orifice. In from twenty-four to forty-eight hours after the first treatment the external opening will usually be found closed. The treatment of a granuloma, *i.e.* the product of a chronic proliferating pericementitis, does not differ from the routine procedure. It should be understood, however, that the dichloramin-T solution must actually pass through the foramen into the periapical space so as to be brought into close contact with the walls of the granuloma.

THERAPEUTIC EVIDENCE.

Regarding the existing sterility of a primarily infected root-canal as treated by the above-outlined dichloramin-T method, it should be emphasized that rigorous bacteriological tests were made in numerous instances by plating out scrapings from the walls of the canals before and after they had been pronounced clinically ready to fill. These tests consisted in subjecting the scrapings to incubation upon agar plates, bouillon, etc. After exposure in an incubator for various lengths of time, usually from forty-eight to seventy-two hours, it was observed in all instances that the growths from these scrapings of the treated canals were negative, *i.e.* no cultures were obtained.

"The day of authority in any branch of science has gone by;—statistics on the table, please." This eminently logical dictum of Prof. Karl Pearson portrays a sound scientific doctrine, and it should be insisted upon as the crucial test of therapeutic evidence of any new remedy. In the discussion of the clinical efficiency of a drug, the *post hoc ergo propter hoc* type of logic is only too apt to creep in, which naturally leads to a biased reasoning. The raw material of science consists of unconformable facts, hence the logic of Aristotle, which ignores this evidence, must be forsaken in an inquiry into the efficiency of a therapeutic agent. On a former occasion, regarding the methods of research, we have stated that—

> In investigation into a remedy, or, for that matter, any biologic problem, the following four rules of research must be observed:
>
> (1) Generally known observations or facts are collected.
>
> (2) Hypotheses are drawn from these observations, and are explained.
>
> (3) Other crucial facts (experiments) are collected to test these hypotheses, and
>
> (4) A second set of facts is collected, and from it are drawn the final conclusions or verifications.
>
> Omitting one of these rules or applying illogical reasoning based on analogy, or inductive instead of deductive methods, leads to a false analysis of the problem under consideration.

The final proof of therapeutic efficiency rests upon the application of the remedy to the patient in conformity with the good old truism, "The proof of the pudding is in the eating." However, the real problem is by no means fully substantiated by clinical evidence only; a causative connection between the remedy and the event has to be established.

The question now arises, What proofs have we in regard to the therapeutic efficiency of dichloramin-T in the treatment of infected root-canals?

(1) *General known observations.* Up to the present (October 1918) Dr. Lee and his co-workers announce that "Records have been obtained from 19,040 completed cases in civil surgical practice which have been treated with this agent, and Captain Sweet, U.S.A., base hospital No. 10, France, in July 1917 obtained the records of a total of 4903 cases treated with the preparation."

(2) *Hypotheses drawn from these observations.* Since the infection of a root-canal and the subsequent suppuration of the periapical tissues does not differ from any other wound infection, it is *a priori* logical to assume that the remedy is also suitable for the treatment of such cases.

(3) *Crucial experiments to test these hypotheses.* Bacteriologic tests of the infected root-canals before and after treatment verify the general claims made for the therapeutic efficiency of dichloramin-T.

(4) *Final verifications drawn from a second set of collected facts.* After one year of observation, clinical inspection of a set of experimental cases, verified by roentgen pictures taken at suitable intervals before and after treatment, pronounces the complete eradication of the initial disease focus, hence a cure.

CASE HISTORIES.

Aside from the momentous question of sterilizing an infected root-canal, the eradication of the sequences of pulp gangrene, *i.e.* apical infection, is equally as important. Here the innoxiousness of the employed drug is especially of vital significance, hence all such compounds as exercise a deleterious influence upon the soft periapical structures must be rigidly avoided. Compounds which are generically classified as caustics, such as concentrated solutions of formaldehyd, phenol, the mineral and certain organic acids, and most metallic salts, should not be employed for the treatment of infected periapical tissues; they produce necrotic areas which furnish a suitable pabulum for those organisms contained in the deeper structures which have not been destroyed by these superficial coagulants, and, incidentally, most metallic salts produce marked discoloration of the tooth structure.

The eradication of infected foci about the apices of teeth by the application of drugs is an extremely mooted question. Aside from the results obtained with electro-sterilization, *i.e.* the utilization of available chlorin, the writer is not aware of any other drug or drug compound, except dichloramin-T, which accomplishes this purpose. Experimentally, proof can now be furnished that infected apical areas, and even granulomas, may be completely eradicated by the application of dichloramin-T solution, provided that the solution is brought into intimate contact with the infected zone. A few cases selected from several hundred clinical records will amply justify this statement.

Case I. Miss S. F., twenty years, presented herself on November 6, 1917. The lower left first molar, having a gold shell crown, was tender on pressure; occasionally swelling near the apical region with paroxysmal pain at various times. A roentgenogram of the tooth showed a large rarefied area near the apices of the two roots, incomplete root-fillings, and an ill-fitting crown. (See Fig. 5.)

Fig. 5.

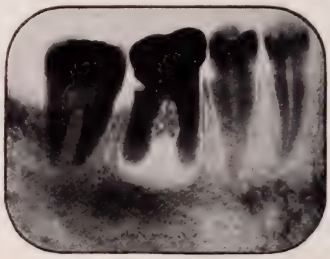


Fig. 6.

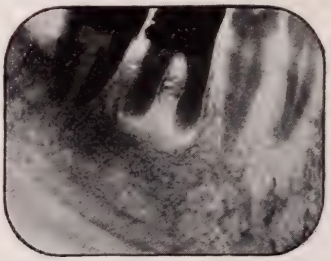
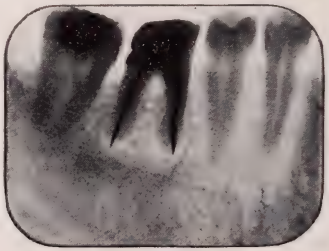
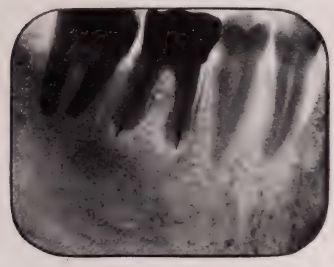


Fig. 7.



Treatment: Removal of crown and root-fillings, sulfuric acid and Na_2O_2 treatment and

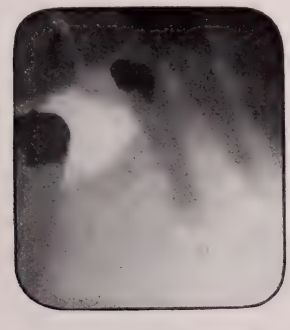
Fig. 8.



dichloramin-T application. The latter was renewed four times at intervals of about forty-eight hours. As this was an experimental case we did not fill the root-canals at once after the last treatment. A second radiograph was taken on January 9, 1918, with the following results: Rarefied area had become lighter and smaller in second picture. (Fig. 6.) Pain had subsided. Bacteriologic examination of root-canals negative. The root-canals were filled. Radiogram taken on April 30, 1918, with the following results: Rarefied area very much reduced. (Fig. 7.) A new shell crown was now put over the tooth, and the last picture taken, on June 17, 1918, with the following results: Rarefied area reduced to a light shadow. (Fig. 8.) Tooth has given perfect satisfaction. On inspection, October 2, 1918, no visible disturbance noticed. Patient refuses to have another X-ray taken.

Case II. Mrs. M. H., forty-five years. Lower second premolar has a metal filling.

Fig. 9.



The tooth reacts painfully at intervals; sore on tapping. Roentgenogram shows a marked rarefied area about the apex. (Fig. 9.) Granuloma? On opening the tooth, the canal was found to contain a small quantity of pulp débris. Routine treatment as above; three applications of dichloramin-T. Bacteriologic examination negative. Root-canal filled June 6th.

Fig. 10.

About one year later, May 22, 1918, patient returned for a second roentgen picture. Tooth perfectly sound. X-ray picture shows a complete clearing up of original rarefied area. (Fig. 10.)

Case III. Mrs. E. W. Sch., age forty years. First and second left premolars sore on pressure; occasional swelling. X-ray, August 1, 1917. (Fig. 11.) Roots opened and left

Fig. 11.

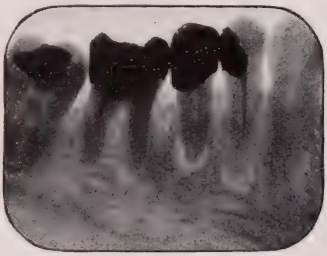
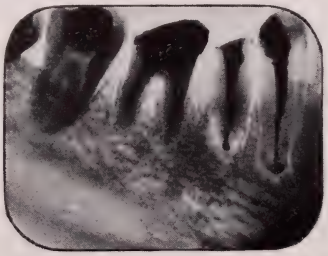


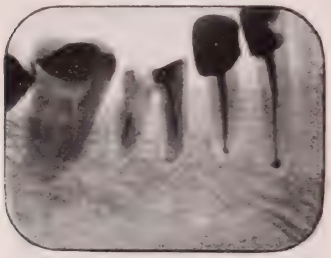
Fig. 12.



open for twenty-four hours. August 3d, routine treatment with sulfuric acid and sodium dioxid. Three treatments with dichloramin-T. Roots filled August 8, 1917. (Fig. 12.) A

roentgenogram taken June 12, 1918, shows eradication of infected apical foci. (Fig. 13.)

Fig. 13.



SUMMARY.

Upon the solicitation of the writer, dichloramin-T has been tried by numerous practitioners, and it has been extensively employed during the session of 1917–18 by the students in our infirmary. The results obtained therewith have been most satisfactory. Basing his assumptions upon the logical sequence of the above-discussed method of investigation and the clinical results obtained with this compound by him and by fellow practitioners, the writer feels justified in recommending to the profession the use of this agent for the treatment of infected root-canals and their sequelæ. On account of its effectiveness, its extreme simplicity of application, and its innoxiousness, dichloramin-T is superior for the above purposes to any other drug so far known.

40th and Spruce sts.

Primary Factors in the Etiology of Periodontoclasia.

By JOHN OPPIE McCALL, D.D.S., Buffalo, N. Y.

(Read before the Maryland State Dental Association, Baltimore, June 5–7, 1918.)

THE attorney who presents his case in a court of law usually prefaces his argument with a statement of the points which he proposes to make, thus focusing the attention of his hearers on the principal features of his discourse, and showing the relationship between matters which might otherwise seem disconnected. So I, though not an attorney, but as your essayist for this session, shall first present to you briefly the main features of my paper, in the hope that in this manner I may best serve the coherence and force of my argument.

The most important point which I wish to make is that the etiology of periodontoclasia is a mixed etiology—that is, at least two causative factors must combine to bring about the destruction of the supporting tissues of the teeth; and moreover, that factors both for and against the health of these tissues must be considered. Next comes the distinction suggested by my title, the division of etiological factors into primary and secondary, with the natural focusing of attention on the group of primary factors.

I wish also to call to your attention the accomplishments of present-day periodontia—the elimination of inflammation and infection around the teeth; the elimination of so-called pockets by the vital attachment of gingival tissue to the root surface; the growth of new bone to at least partially replace bone destroyed through periodontal disease. As a corollary to this I request your very serious consideration of the practicability of the prevention of periodontal disease, not by the specialist alone, but by the general practitioner, with particular refer-

ence to the responsibility we must all assume for the loss of teeth not attacked by periapical infection.

While this paper is not to deal primarily with the pathology of the periodontal tissues, it is impossible to consider the etiology of periodontoclasia without suggesting a revision of the somewhat vague pathology and classification of periodontal diseases exhibited in most of our current dental writings, for the purpose of bringing the entire group of ailments commonly known as "pyorrhea alveolaris" into an orderly concourse well within the comprehension of the average dental practitioner.

Before embarking on the elaboration of these points I should like to call to your attention the distinction commonly made between a fact and an hypothesis, and the place that each occupies in science. A fact is something which has been proved and can at any time be proved to be true. Naturally in dealing with any of the branches of physical science it is highly desirable that our concepts should be based on facts, or at least be susceptible of proof. An hypothesis is an assumption, which may not have been proved and may not even be susceptible of proof, but which accords with some of the known facts on which it bears. A concept which accords with *all* known facts may properly be accepted as being true, and may also be taken as a foundation for the formulation of theories regarding various groups of related phenomena. One of the fundamental hypotheses of natural science is that proposed by Avogadro regarding the number of molecules in equal volumes of gases. Avogadro's hypothesis will probably never be proved, yet upon this assumption is erected the towering structure of modern chemistry, because it accords with all known facts of chemical science.

In the course of the development of medical and dental science many hypotheses have been proposed. If they have always tallied with fact, then they were correct. And many hypotheses have been accepted and later proved—as, for instance, the assumption regarding the organism responsible for malaria. On the other hand, many hypotheses have been found to be accordant with only part of the facts, and have had to be rejected, as the assumption that the endamœba buccalis is the specific cause of dental periclasia. We must always bear in mind, too, that theory must adjust itself to fact, not fact to theory. In other words, if a phenomenon always occurs in the same way and under the influence of the same causative factors, any theory which does not agree with that sequence of events, no matter how plausible it may seem, must be rejected or remodeled to fit the facts.

No one could wish more ardently than your essayist that out of the maze of speculations of the past an orderly proven set of facts might be presented to you regarding the causation of periodontoclasia. Study of the etiology of this group of dental disorders has revealed the interaction of many factors of widely divergent types, making this etiology nearly as complex as, for instance, the parasitology of the mouth—so complex, in fact, as to make its reproduction in the field of animal experimentation very nearly an impossibility, thus making the proving of our hypotheses enormously difficult. It is, however, a well-known axiom that the successful treatment of disease lies in the removal of the cause; thus an assumption regarding etiology may be considered to be correct if uniformly successful results follow its application. And it is upon this uniform sequence of diagnosis, treatment, and result, not only in my own hands but in the hands of many others, that the hypotheses I present to you have been built up. The acid test for the correctness of these assumptions lies in the success with which others may apply them in their own practices. This calls for a word of caution. Remember that it is easy even for the specialist to overlook one out of several contributing etiological factors present, hence the great possibility of an incomplete diagnosis by the untrained observer, with the consequent failure to obtain results. Remember also that root surgery, which is involved in practically

all treatment, must be perfect in its execution; this requires temperament as well as an exacting technique on the part of the operator.

The attempt to apply the principles laid down in this paper by the general practitioner will thus be apt to meet with only partial success, especially if he applies them first, as he is very likely to do, in the treatment of his advanced cases. Failures thus encountered do not of course invalidate the hypotheses I propose; on the contrary, these failures may be turned into stepping-stones which, with persistent study and improvement in technique, will lead to the uniformly successful results obtained by others.

ETIOLOGY OF PERIODONTOCLASIA.

The etiological factors responsible for the various disorders to which we give the generic name "periodontoclasia" may best be considered in groups, thus avoiding the confusion which would otherwise be inevitable. These groups are as follows:

(1) Malocclusion.
(2) Defective operative and prosthetic procedures.
(3) Trauma.
(4) Abnormality of tooth surface.
(5) Parasitic invasion.
(6) Abnormal systemic conditions.

The first four are the groups which I call primary, the fifth and sixth being secondary. I have felt it necessary to call these primary and secondary factors, rather than predisposing and exciting, as is the common practice in pathology, and for this reason: There are several factors which are incapable of inaugurating a disease process in the periodontal tissue, yet which are directly concerned with the production of some of the typical phenomena of the disease, and which thus may properly be called exciting causes. For instance, bacteria are incapable of proliferating in a healthy or hypertonic tissue; they accordingly cannot be a primary cause of periodontoclasia. Yet the severing of the pericemental fibers with resulting pocket formation does not take place unless bacteria invade this tissue and proliferate within it. Bacteria are thus seen to be a true exciting cause of this type of dental periclasia, the primary factor on the other hand being something which lowers the tone and hence the resisting power of the tissue.

It may be argued that the term predisposing is virtually synonymous with primary. This might be true if a predisposing cause was always a predisposing cause. But we find that the same factor may be a predisposing cause in one case and an exciting cause in another. But a primary cause is always a primary cause. Then again, to use the terms predisposing and exciting usually means that we give our attention principally to the exciting cause, often forgetting that the exciting cause is inoperative except as it is preceded by the predisposing cause. And I think our medical brethren are occasionally guilty of the same error. To use the term primary on the other hand focuses our attention on the important and determining factor.

Our primary factors in about the order of their importance, are malocclusion, defective operative and prosthetic procedures, trauma and abnormality of tooth surface. We will now consider these groups in detail with their subdivisions.

MALOCCLUSION.

Malocclusion as a factor in dental periclasia has three subdivisions, *i.e.* traumatic occlusion, defective approximal contacts, and labio-lingual malposition. Traumatic occlusion is a term suggested by Dr. Paul R. Stillman to apply to any form of malocclusion whereby the tooth or teeth are driven beyond the normal limits of movement within their sockets during contact with their antagonists in closing or in movements of mastication. It is at once the most destructive factor in dental periclasia, and usually the easiest of prevention in any practice in which the teeth are under observation and control from infancy on through adult life. A whole essay could well be

written on traumatic occlusion, but I shall here try to bring out simply the main points regarding this destructive agency. There are three ways in which the periodontal tissues may receive an occlusal trauma, viz, excessive impact on one or more cusps through elongation or rotation; impact at an angle to the long axis of the root through tipping, as after extraction; and a thrust to one side of the socket due to an elongation or closing up of the bite in the incisal region, or inharmony of the inclined planes in the bicuspid and molar region. The commonest causes of traumatic occlusion are malocclusions of the Angle classification, extractions without retention of space, lack of normal wear of cusps with advancing years, and faulty operative and prosthetic restorations. Extraction, unless the space is retained by an orthodontic retainer, denture, or bridge, will result in drifting and tipping of the remaining teeth, and a closing up of the bite, bringing an impact at an angle to the long axis of the tipped teeth and excessive stress on the anterior teeth, to say nothing of the opening up of contacts. A greater variety of traumatic occlusions may be brought about by extractions than through any other one operation.

Faulty dental operations bring about traumatic occlusion in a surprising number of cases. Fillings are built just a little too high; occlusal surfaces are not carved to retain normal occlusion, thus permitting the teeth to drift; the lingual surfaces of upper anterior crowns are made a little too full. But more particularly is damage done in the much-berated field of crown and bridge work through making occlusal surfaces too high or through failure to plan for the various movements of the mandible. Occlusal trauma thus instituted is 100 per cent. more destructive than ill-fitting bands, the lack of individual movement of abutments, and uncleanliness, to which so much has been charged in the past. Failure to recognize the part played by traumatic occlusion in virtually pounding crowns and bridges out of patients' mouths, is largely responsible for the muddle in which the crown and bridge branch at present finds itself.

Clasps and Gilmore attachments, used for partial dentures, often produce a tipping effect or side-thrust during mastication which constitutes a very serious trauma. Wing bridges and excessive contacts without an occlusal rest on the adjacent tooth do much damage also. Failure to wear down high cusps of the natural teeth with advancing years often means the continuance of a heavy side strain in the movements of mastication to the point where it becomes an actual trauma. Malocclusion according to the Angle classification does not necessarily mean traumatic occlusion, but mouths in which any abnormality of occlusion exists should be carefully scrutinized for the presence of teeth so placed as to meet their antagonists a little to the buccal or lingual of their proper position; teeth tipped labio-lingually or bucco-lingually; rotated teeth; and excessive overlap in the incisal region.

In the case of most causative factors the method of correction will be suggested simply by calling attention to the cause itself. In the case of traumatic occlusion this may not be so obvious. The carborundum stone guided by articulating paper is the agent most often used, elongated teeth and high cusps being shortened, and occluding surfaces being reshaped to give harmony between the inclined planes of the opposing teeth, as for instance the dressing down of the labial surfaces of the lower incisors. In cases where a number of teeth have been lost or there has been excessive abrasion, it may be necessary to open the bite if the above method would entail an excessive cutting of tooth structure. In regard to crown and bridge work let me suggest that the beginning of the traumatic occlusion comes in taking the bite. Inspection of the occlusion of teeth not covered by the wax both before and during the taking of the bite will enable the operator to detect errors in this step. When the bridge is inserted, be sure that the teeth in the mouth occlude the same as before insertion, and be sure that the bite on all the teeth feels natural to the

patient. The final decision on this can only come after the eating of several meals. The bridge that feels like a stone wall in the mouth is one which does not occlude properly.

Damage done by open or improper contacts has been very fully considered in the past, and need not be enlarged upon in this paper. It is well to point out one fact with regard to open contacts not previously emphasized, namely, that damage is done not only by impaction of food, but by the loss of necessary mesio-distal support, thus permitting a movement of the teeth which leads to a real traumatic occlusion.

Labio-lingual malposition when not a cause of traumatic occlusion or of defective contacts between adjoining teeth is a factor in periodontoclasia, because it increases the difficulty of keeping the tooth surface clean. This condition is often found in the lower incisal region due to narrow arches with consequent crowding, and may sometimes necessitate the extraction of one tooth and the realignment of the others to avoid the loss of several.

DEFECTIVE OPERATIVE AND PROSTHETIC PROCEDURES.

The next group of etiological factors has to do with the operations performed by the dentist for the restoration of lost tooth tissue. Mention has already been made of the damage done by traumatic occlusion through building occlusal surfaces too high or with an inharmonious arrangement of the inclined planes. Remember that the teeth may meet properly in the ordinary closing of the jaws, yet exhibit a marked traumatic occlusion in the movements of mastication. Open or improperly formed contacts have also been mentioned. Much damage is done by placing fillings or crowns without regaining space lost by the teeth tipping together as a result of interproximal decay. This squeezes out the gum tissue from between the roots, making a splendid lodging-place for deposits of tartar, food, and bacteria, and making it impossible for the septal tissue to be maintained in a state of health. Let me recommend the Perry separator and base-plate gutta-percha here. Edges of crowns need never go farther than half a millimeter under the gum margin unless unusual strength is required.

The usual taper of the root renders it utterly impossible to make a band which will fit any farther up the root than the root-trimming instruments will go—and they seldom go far enough under the gum to be lost to sight. In many mouths the gums will not tolerate the least contact with a band no matter how well fitted. The trimming of gingival margins of fillings without injury to the gum is difficult. It will usually be best accomplished with delicate files, of which several designs are available. Failure to properly restore the shape of labial and lingual surfaces may subject the gum margin to unaccustomed impact of food passing rootwise over these surfaces in mastication. All restorations must have polished surfaces to permit of proper cleaning. It seems to be little appreciated that the gum tissue immediately around a natural tooth is more sensitive to pressure than the gum tissue over the bony ridge where teeth have been extracted. This requires extra grinding of facings and trimming of dentures where they are to rest against these tissues.

TRAUMA.

Trauma, as distinguished from traumatic occlusion, means an injury effected usually from outside the mouth. Extreme and rapid separation, improper use of clamps and ligatures, and blows may do much damage to the periodontal tissues. Improper or excessive use of the toothbrush may do some harm, though usually slight as compared with that produced by insufficient brushing.

ABNORMALITY OF TOOTH SURFACE.

By abnormality of tooth surface we mean a surface which exhibits a roughened or etched enamel, abnormal form, or presence of hard or soft deposits. Rough enamel may be as irritating to

the gum margin as a foreign substance. Abnormal form acts through encouraging the formation of deposits, or permits unnatural impaction of food against the labial or lingual gum margin. Hard deposits are both salivary and serumal calculus. Hard and soft deposits irritate both mechanically and chemically.

ABNORMAL SYSTEMIC CONDITIONS.

Of the secondary etiological factors, we may give some attention to abnormal systemic conditions. These include definite disease conditions such as diabetes, syphilis, etc.; nutritional disturbances; neuroses; conditions of the circulation both general and local.

Most of the etiological factors we have been considering, both primary and secondary, have their opposites or factors favoring health. These may often be so marked as to more than offset pathological factors present, or alter very materially the type of disease. For instance, a patient came to me some years ago with the upper and lower right bicuspids meeting practically edge-to-edge. The buccal cusp of the upper was worn down practically level with the sulcus, evidence that a very marked traumatic occlusion must have existed when the teeth were first erupted. In the average mouth this tooth would have been loose, with decided inflammation, pocket formation, exudation of pus, in short a severe case of pericementoclasia. In this case the tooth was firm and the surrounding tissues normal except for a slight recession on the buccal aspect. The man was a horse-trainer, living out of doors the year round, and had never had a day's illness. The vigor of his constitution and of the periodontal tissues was such that he was able to correct the occlusal trauma by abrasion before the tissues around the tooth gave way under the strain.

VARIOUS TYPES OF PERIODONTOCLASIA.

We shall now take up the various types of periodontoclasia with special reference to the etiological factors concerned in their production. In analyzing the field, we find five distinct types of periodontal disorders, namely, gingival recession, gingivitis, pericementoclasia, alveoloclasia, and periodontal abscess. Each of these may be subdivided as our knowledge of them is extended. As in the case of the etiological factors, two or more of these disease types are often found in one mouth or around one tooth, yet these cases can always be analyzed and the types differentiated. This is a great aid in diagnosis, since we find that certain causative factors have a tendency to produce certain types of disease. This is a point I cannot emphasize too strongly, and I shall enlarge on it a little later. The name of each disease type indicates the portion of the periodontal tissues chiefly involved, hence careful examination by mouth mirror, blunt explorer, and palpation will determine the type or types present. To those not familiar with this classification it might be pointed out that the distinction between pericementoclasia and alveoloclasia lies in the formation of the typical pocket, pericementoclasia being the type which occurs as a result of the severing of the pericemental fibers. In alveoloclasia the pericementum is not destroyed to the extent that a pocket is formed, but the bone of the alveolus is absorbed, allowing some movement of the tooth in its socket. This type is more common than is generally supposed.

While the etiology of these diseases is so complex as to make it impossible to consider all of the factors which may enter into the causation of each, yet it will be possible, and I hope valuable, to point out the factors most commonly associated in producing these types, remembering always that no one factor is by itself capable of producing periodontal disease.

GINGIVAL RECESSION.

Gingival recession in its pure form consists of a drawing back of the gum tissue coincidently with some absorption of the crest of the alveolus, thus exposing the cementum, but without visible evidence of inflammation or pus formation.

The primary factor is usually trauma—an excessive and improperly directed use of the brush or undue impaction of food on the labial or lingual gum margin. Secondary factors are frail bony support and insufficient local circulation. Traumatic occlusion may be a primary factor especially if resistance to infection is so marked as to prevent pocket formation.

GINGIVITIS.

Gingivitis is an inflammation of the gingival margin, the pathology being similar to that of inflammations in other soft tissues. Primary factors are mechanical irritants such as hard or soft deposits, outstanding edges of fillings or crowns, etched enamel, defective contact, and traumatic occlusion. Secondary factors are sluggish circulation, lowered resistance to infection, bacterial invasion, and nutritional disturbances. These factors if combined with trauma, and in many cases without it, will cause a combined gingivitis and recession with possible pus formation. This combination is characterized by the fact that the recession keeps pace with the severing of pericemental fibers, and thus no pockets are formed. It is thereby differentiated from pericementoclasia. A sub-type of gingivitis is acute ulcerative gingivitis, sometimes called Vincent's infection. It is characterized by sudden onset, severe pain, rapid ulceration of the gum margin, sometimes sufficient to expose the alveolus, and general febrile disturbance. In this type alone do we find bacteria playing very nearly the part of a primary factor. Their attack is, however, always preceded by a chronic gingivitis from tartar, edges of fillings, etc., which may be so mild as to have escaped notice previously. The bacteria are Vincent's spirochete, a streptococcus, and a fusiform bacillus, acting in symbiosis. They form an anaerobic combination, this feature indicating the desirability of an oxidizing treatment. Sodium perborate, a teaspoonful in half a glass of water, gives most satisfactory results, along with careful and thorough scaling and polishing.

PERICEMENTOCLASIA.

Typical pericementoclasia exhibits a severing of the pericemental fibers with corresponding absorption of the bone of the alveolus, but without destruction of the overlying gingival tissues, resulting in the formation of a pocket. It may be complicated with gingivitis or recession, or both. There may or may not be perceptible pus formation. The tooth may or may not be loose. This is the typical so-called pyorrhea alveolaris. The most common primary factor in pure pericementoclasia, and one almost constantly present when the tooth is loose, is traumatic occlusion. Open or defective contacts usually produce a gingivitis as well as a pericementoclasia, but not looseness. Rough margins and deposits of various kinds will be a factor in producing gingivitis, but are not in themselves capable of producing pockets, as stated before. In other words, when your blunt platinoid probe slips into a pocket, look for either traumatic occlusion or open contacts. When a tooth is loose, look for traumatic occlusion. The secondary factors are the same as in gingivitis.

PATHOLOGY OF PERICEMENTOCLASIA.

The pathology of pericementoclasia needs some consideration, and for this purpose we cite a typical case: Let us assume that we find a tooth somewhat loose, with a pocket from which pus can be expressed, slight gingival inflammation, but practically no recession. The train of pathological phenomena starts with an irritation of the pericementum by occlusal trauma, the side on which the pocket will later appear being that which receives the greatest strain. Next we find an active followed by a passive hyperemia in the pericementum. Then comes slight absorption or rarefaction of the bone of the alveolus. Following this we find an exudation of a serous or even of a hemorrhagic nature under the free gum margin, resulting in the deposition of serumal calculus at this point. To the occlusal trauma we now find added

the irritation of this serumal deposit, producing a gingivitis which paves the way for bacterial invasion of the gingivæ and pericementum. Pus formation then begins, with bacteriolysis of the pericemental tissue preceded by absorption of the bone of the alveolus. Inflammation continues, with its serumal or hemorrhagic exudate, and consequent progressive formation of serumal calculus.

The points to which attention should be called are, first, the primary traumatic occlusion, and then the secondary part played by the serumal calculus. This calculus, although an active irritant, is not an original cause of the disease, but is in a sense the result of the disease. In other words, we need to look on serumal calculus when encountered in our exploration of a mouth, as a diagnostic sign, a guide-post pointing to some preceding irritant. And our treatment must accordingly be planned so as to remove not only the serumal calculus, but the irritant responsible for its presence. This previous irritant is very commonly a traumatic occlusion, but any of the other primary factors may be responsible.

The point I am driving at is not simply to give a diagnosis of a fully developed case of pericementoclasia, but to indicate the means by which it may be detected in the early stages, so that preventive measures can be applied. In other words, if you find a departure from the normal when examining the soft tissues, look for the primary factors which may be responsible. I have found traumatic occlusion to be so constant a factor in peridontoclasia that I have made it a rule to examine for it whenever I find serumal calculus or even a gingivitis, unless these are very obviously explainable by the presence of salivary calculus, edges of fillings, open contacts, or some other primary cause. It might be well to call attention here to one of the mysteries of the past, the hit-and-miss nature of pericementoclasia, the healthy tooth between two badly diseased teeth or the very loose tooth between two sound ones. This is all cleared up by having the patient close the teeth and simulate the movements of mastication. The loose teeth will move as contact with their opponents is made, thus demonstrating the traumatic occlusion. So we find that the mystery is no mystery, but the inevitable result of an excessive strain on the supporting tissues of the affected teeth.

ALVEOLOCLASIA.

Alveoloclasia, as stated before, is characterized by absorption of bone, allowing mobility of the tooth, without a severing of the pericemental fibers. It is apt to be accompanied by some recession, but usually not by gingivitis. The primary cause is always a traumatic occlusion. Freedom from deposits and high resistance to infection make bacterial invasion difficult, hence the pericementum is left practically intact, and there is no pocket formation, no exudation of pus.

PERIODONTAL ABSCESS.

Periodontal abscess may be one of three varieties, *i.e.* pericemental abscess occurring in a previously normal pericementum; gingival, discharging through the gingival tissue overlying a previously formed pocket in a case of pericementoclasia; and periapical, ordinarily called alveolar abscess. Since the last-named occurs as a result of root-canal infection, it need not be considered here. The infection in pericemental abscess is usually of hematogenous origin, rather than an invasion from the gum margin, but the primary factor is usually an accidental trauma or traumatic occlusion. Gingival abscess is a sudden "firing up" of a previously established chronic suppuration. The primary factor is of course that of the original disturbance. The formation of this secondary abscess is due to gravity, sluggish circulation from diabetes or some other systemic disorder, or the partial closure of the gingival orifice of the pocket. Abscesses may occur in a gum margin due to presence of a hard material such as food or cement under the gum margin of a tooth on which a band or orthodontia appliance is fitted.

RESPONSIBILITY OF THE GENERAL PRACTITIONER IN PERIODONTAL DISEASE.

Before summing up, let us consider for a moment the responsibility of the dental profession in the department of periodontal disease. You will agree with me, I think, when I say that he who represents himself to be a practitioner of dentistry is morally and legally bound to provide for his patients the benefits which the current state of knowledge of the dental art puts within their reach. If a considerable number of dentists are able to prevent and cure dental periclasia, and if the methods of preventing it are within the grasp of the general practitioner, then the responsibility for the loss of teeth whose value cannot be measured in dollars and cents rests squarely on his shoulders. Abscesses due to root-canal infection are making it necessary, and will probably continue to make it necessary, to extract many teeth in which disease has obtained a foothold, due often to legitimate causes affecting the health of the pulp. But the legitimate loss of teeth through periodontal disease is very rare, providing the patient consults his dentist at regular intervals and takes proper care of his mouth. There are two reasons for this—periodontoclasia *can* be cured, and still more important, it *can* be prevented—and, as usual, prevention is easier than cure. Dentists who are specializing in this field are able to check gingivitis, eliminate infection and pus formation, make loose teeth firm, in many cases cause the overlying gingival tissue to form a vital attachment to the cementum, and, moreover, to bring about a new growth of the bone destroyed by the previously existing disease condition. This constitutes a cure, since it restores the parts to health and functioning power, closes up pus pockets, and, in a word, restores the periodontal tissues to essentially their original condition. The specialist and also the general practitioner can with even greater certainty perform a still more valuable service, namely the prevention of these disorders, or what amounts to the same thing, the cure of incipient cases.

To prevent or cure necessitates a knowledge of the conditions involved, their etiology and pathology. Application of this knowledge, or diagnosis, requires first a training in the detection of periodontal disorders in their earliest perceptible stages, even more than in the advanced conditions. This may be most effectually accomplished by the use of a chart on which provision is made for the recording of conditions of the soft as well as the hard tissues, and the etiological factors present. Examination of the soft tissues necessitates the use of an instrument not often found in the dental office, a soft blunt explorer of platinoid or silver of about No. 26 gage. This instrument can be slipped under the gum margin to detect pockets and their approximate depth, without causing any injury or much pain. Since all surfaces which have lost any pericementum need surgical treatment, it is not necessary to use a tempered explorer to detect tartar, especially as the scaler properly used will give much more accurate information of that nature.

In making examinations we should be ever on the watch for traumatic occlusion. Inflammations and deposits of serumal calculus which are unevenly distributed about the mouth or which are not readily explainable by other factors, will point to this arch evildoer, as will all loose teeth.

In treatment it should be remembered that the relief of traumatic occlusion must be carried to a point where the affected tooth may have rest. If grinding is done it must be continued until the articulating paper will barely mark the tooth, and the tooth itself does not move in any of the movements of mastication—unless, of course, grinding is contra-indicated by some other condition. Spaces between teeth should always be closed, even if not apparently doing any harm when first noticed. The harm will come in the course of time.

Root surgery, or scaling so called, must be perfect to secure results. In other

words, failure to stop pus and inflammation does not mean that the disease is of systemic origin, that standby of the past, but that root surgery or the relief of some primary factor has been incomplete.

A vigorous circulation of blood in the gums is one of the essential barriers to disease. It is obtained by vigorous and properly directed use of the tooth brush, by vigorous mastication, and by properly given prophylactic treatment with the orange-wood stick. Better a little recession from over-brushing than stagnation and débris from under-brushing.

It should be remembered that the usual "cleaning" of the teeth by the dentist will not prevent caries or periodontoclasia. Learn to know how a prophylactic treatment differs from a cleaning, and then teach this distinction to your patients.

In closing, let me remind you that there is nothing supernatural in nature. Every event has its cause; mysteries are mysteries only until the relation of cause and effect is determined. So in regard to this subject: The causation of periodontoclasia once determined is as logical as any geometrical problem. And since we find that the causes in practically all cases are under our control, we cannot truthfully take refuge in the old saying that "Pyorrhea cannot be cured," but must shoulder our responsibility and do to our patients as we would be done by.

437 Franklin st.

[See also *Discussion*, as reported under "Proceedings of Societies," this issue.]

When Shall Root-canals be Filled, and How?

By ARTHUR BARTON CRANE, D.D.S., Washington, D. C.

(Read before the Maryland State Dental Association, Baltimore, June 5–7, 1918.)

THE leaders of the medical profession are waiting with open minds for conclusive evidence that periapical infection can be eliminated by treatment through the root-canal. Meanwhile, knowing full well that extraction and thorough curettage will be followed by a healthy condition of the tissues, it is small wonder that many physicians are demanding such treatment for all infected teeth. This attitude will continue and increase until some tangible method of proving the effectiveness of root-canal treatment is available.

The present dependence upon radiographic check, while reasonably convincing in some cases, requires from three to six months for demonstration. In cases attended with serious metastatic lesions this interval may be sufficient, if periapical infection persists, to so increase the malady that all chances of recovery are lost. This method, further, is controvertible on the ground that evidence exists that new bone-growth may take place in the presence of dangerous infection. Even eliminating these objections, the check-up method is inefficient because of the disinclination of dentists and patients alike to make use of it. Hence, if we are to have a method of proving the elimination of periapical infection which will be universally valuable, it must be applicable prior to the filling of the root-canal.

Since the necessity for completely filling all canals has become an accepted policy, methods have been advanced and instruments have been invented by which this can be accomplished, in most cases,

to a reasonable certainty. The time has come, it having been demonstrated that the mechanical difficulties can be overcome, to give more widespread consideration to the manner of determining when sterilization has been accomplished. Until the sterility of the tissues can be reduced to demonstration, the filling of root-canals remains an empirical procedure, worthy of the condemnation it is receiving in many quarters. A study of culture methods and culture media is the foundation upon which must be builded any attempt to predetermine the possibility of success in this operation.

CULTURE METHODS FOR DETERMINING STERILITY OF ROOT-CANALS.

The first difficulty to present is that of obtaining a reliable material for the culture. The finding of a negative result may only mean that the material has been gathered from a part of the field temporarily under the influence of antiseptics, or that enough of the antiseptic remaining in the canal has been carried over to inhibit bacterial growth. The finding of a positive culture may be the result of contamination.

For about two years the writer has taken cultures from practically every tooth treated, the method being to dry the canal with cotton points, absorbing any excess of antiseptic present, and then passing a sterile apexographer through the canal until pain is experienced. As the instrument is withdrawn it is made to scrape the side walls of the canal, and then used to inoculate the media.

For the purpose of checking the value of this technique the following experiment was made: In fourteen cases sterile cotton points were immersed in a sterile 25 per cent. solution of glycerin and sealed into the canals with gutta-percha rendered sterile in the flame. Four days or longer were allowed to elapse, dependence being placed upon the hygroscopic action of the glycerin to induce osmosis, and thus draw into the cotton the fluids in the dentin and periapical region. At the following sitting the cotton points were removed with sterile forceps and dropped into the culture tubes. Immediately thereafter a culture was taken with the apexographer as described. Considerable difficulty in preventing contamination of the cotton was experienced, as in most instances it stuck to the forceps or to the side of the culture tube and had to be released with another instrument. However, allowing for this contamination, which did occur in four cases, as shown by the growth of spore-forming bacilli, the results were the same in all cases save one. When one tube was negative, the other also was negative; when one was positive, the identical organism developed in the other. The one exception was a case in which the tube inoculated with the apexographer developed a streptococcus growth, while the tube inoculated with the cotton grew a spore-forming bacillus only.

As a further test of the usefulness of the apexographer method, another series of six cases was tried, this time using glucose broth to saturate the cotton points, thus furnishing a rich pabulum for the propagation of any vital bacteria within the field. This experiment resulted in a similar coincidence of results, with one exception, in which a streptococcus grew in the cotton tube, while the apexographer tube remained negative.

If these experiments prove anything, they establish the apexographer method of taking the culture as reasonably dependable.

While it is possible that some more efficient method of taking the culture may be developed, with such an easy means now at our command there is no present justification for an empirical acceptance of unreliable clinical evidence in determining when a canal is ready for filling. While it cannot be refuted that the finding of a negative result by this method is not always an absolute assurance of sterility, yet the finding of a positive result is a sure indication that sterilization has not been accomplished, and by this guide alone we shall be prevented from filling the canals of many infected teeth which would otherwise seem to justify that procedure. For those who have not taken the routine

caution of making cultures prior to root-canal filling a surprise is in store, for streptococcus growths will be recovered from about 30 per cent. of all cases which give every clinical indication of successful termination of the treatment.

Next in difficulty only to obtaining the culture is the selection of a practical culture medium. At the beginning the writer used an agar slant, which was inoculated with a stab and a smear. The slowness with which growth was developed led to the opinion that a sufficient amount of antiseptic must have been carried over with the culture material to cause inhibition of bacterial growth. It was therefore decided to use liquid culture media, and in such volume as to dilute this inadvertent antiseptic to a neutral state. Glucose broth, Besredka's egg broth, and glucose broth enriched with human ascitic fluid, have all been tried and compared.

As in the overwhelming majority of cases we have to deal with the streptococcus, some medium especially acceptable to its growth must be selected. The uncertainty of growth in glucose broth soon caused us to discard it. The ascitic fluid media undoubtedly gives a large percentage of growths, but the difficulty of obtaining and keeping it in a sterile condition makes it rather impracticable for the average dentist. Careful comparative tests have been made with the egg medium which demonstrate its prompt efficiency in growing all strains of streptococci, and this medium is easier to make and keep.

The length of time allowed before pronouncing a negative result is also of importance. With the ascitic fluid medium we had one case which developed a streptococcus growth on the thirteenth day, and with the egg medium one which developed on the eighth day. With these exceptions, however, we have had no growths developed in either of the above media after the third day, so that is now being used as the minimum time for culture.

Thus far I have tried to impress the importance of some test for sterility before filling the canal. This practice is not expected to appeal to those who blindly attempt to treat all infected teeth, nor to those who advise extraction in every case. Fortunately for the conservative dentist there lies a mid-course in which such precaution will lead toward success. Antiseptics will not work magic, and whatever their virtues they are only a means to an end, which is the elimination of the infection.

It is my belief that if there is any present means of accomplishing this, it lies in the use of electrolytic medication, combined with dressings of the mildest antiseptic oils during the intervals between treatments. The use of powerful antiseptics of escharotic character has been relegated to the mistakes of the past, while the filling of the canal with so-called permanent antiseptics is a fallacy so transparent as to require no time for discussion.

SELECTION OF TEETH IN WHICH THE ROOT-CANALS MAY BE SUCCESSFULLY FILLED.

It may as well be acknowledged that there are many infected teeth which cannot be saved; but a selection of risks, through careful diagnosis, makes a favorable prognosis reasonably safe in many cases.

For the sake of convenience, pulpless teeth which are rarely benefited by antiseptic treatment may be classified in three groups, as follows:

Group I: *Teeth having considerable dead apical cementum.*

Group II: *Teeth having considerable dead alveolar cementum.*

Group III: *Teeth having their apical openings within the maxillary sinus.* (Fig. 1.)

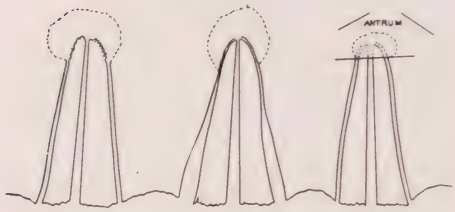
A careful consideration of the features of these three groups may have a tendency to prevent many unsuccessful attempts at tooth treatment.

GROUP I.

This group consists of "Teeth having considerable dead apical cementum."

(Fig. 2.) After one has extracted a number of badly infected teeth and curetted the periapical bone, or better still, has cut down upon periapical lesions for root resections, it requires an intense faith in the potency of antiseptics to believe that this infected field, full of dead and dying

Fig. 1.

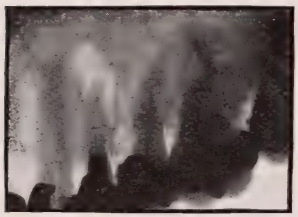


Group I. Group II. Group III.

Types unfavorable for canal medication: I. Too much dead apical cementum. II. Too much dead alveolar cementum (pyorrhea). III. Canal opening within the antrum.

tissue, can be restored to health by treatment through the canal. That certain infected teeth are rendered safe by such treatment is past dispute, hence any method of foretelling which teeth give promise of recovery is of value. With this in mind I proposed, about a year

Fig. 2.



ago, a system of classifying periapical disease by radiographic study. Your indulgence is asked for a reconsideration of this plan.

In dealing with periapical disease we are confronted by three distinct conditions, easily recognized in the film, which may be differentiated as follows: Class No. 1: Circumscribed radiolucent areas. Class No. 2: Diffuse radiolucent areas. Class No. 3: Circumscribed radioparent areas. (Fig. 3.) Let us examine each of these classes in turn.

(1) *Circumscribed radiolucent areas.* These may vary from a slight thickening of the apical pericementum to a considerable rarefying osteitis. No matter to what degree the tissues are affected, however, to fall into class 1 the film must show a circumscribed area with the line of demarcation between radiolucent and normal bone indistinct. (Fig. 4.) This class represents the primary results of infection, and the affected area is circumscribed, because the vital forces,

Fig. 3.

Class 1. *Class 2.* *Class 3.*

1 Circumscribed radiolucent area (granuloma). 2. Diffuse radiolucent area (granuloma). 3. Circumscribed radioparent area (dental cyst).

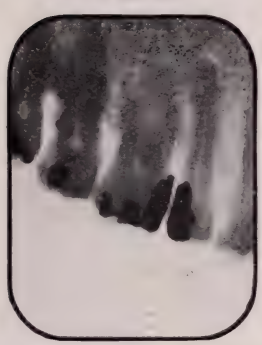
while being slowly overcome by the invading organisms, are as it were making an orderly retreat. It often happens at this stage that proper root-canal treatment so attenuates the invading organisms that the balance of power passes to the tissues and a cure results.

(2) *Diffuse radiolucent areas.* The irregularity of outline may vary from a simple break in limitation to an entire loss of regular form. The line of demarcation between normal and radiolucent bone is even less distinct than in class 1. (Fig. 5.) This appearance in the film is produced by ramifications of granulation tissue, which extend from the central mass into the surrounding bone. Wherever this abnormal tissue comes in

contact with bone or cementum, disintegration of the hard tissue takes place; the cementum becomes roughened, and the bone becomes softened. Teeth of this class represent the effect of neglect or of impropr treatment of class 1 cases, and while they sometimes respond to treatment, the ascendency of the infection is so pronounced that it is seldom that teeth of this class are restored to health, except by root resection.

(3) *Circumscribed radioparent areas.* In this class the film shows an intensely dark area surrounding the root-apex and this area in turn is surrounded by a dense white line, which definitely separates the radioparent area from the normal bone. (Fig. 6.) Such a picture is always indicative of the formation of a cyst, which is nature's method of protecting the organism from the baneful effects of certain noxious irritants. Hartzell in a recent paper states that these cysts are always the result of infection and that they are always infected. While my own opportunity for investigation has been extremely limited as compared with his, I am emboldened to disagree with him by the fact that repeated attempts to get growths from the fluid in cysts attached to the roots of teeth with unbroken enamel covering the crown have met with failure, and this result cannot be entirely disparaged by criticism of the culture methods or culture media.

Fig. 4.



(Class 1.)

Fig. 5.

(Class 2.)

Fig. 6.

(Class 3.)

Dental cysts are frequently a late sequel of devitalization of the pulp from traumatism, but unless infection is introduced into the canal by the invasion of decay, or by the injudicious attempt of an overzealous dentist to treat the tooth, they may increase to the size of an English walnut, and still, to the best of my knowledge, remain sterile. On the other hand there is good evidence that in certain cases these cysts may form about class 1 infections of low virility, thus to a certain extent limiting their danger. Whether infected or not, such apical conditions are probably never eradicated by treatment through the canal. The cyst wall, which lines the dense layer of bone, indicated by the white line in the radiograph, must be entirely destroyed or the cyst will be re-formed.

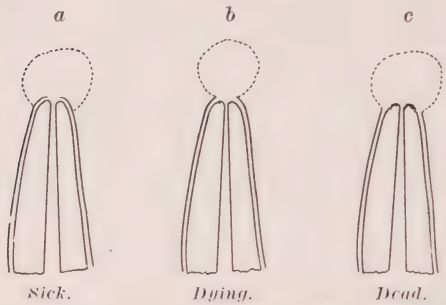
To return to the subject of the selection of risks, it will be seen that most cases in class 2 (Fig. 5) and all cases in class 3 (Fig. 6) have so much denuded apical cementum that the attempt at treatment through the canal by any of the methods now in vogue is a doubtful procedure. Such teeth, therefore, are included in group I.

GROUP II.

In the second group are "Teeth having considerable dead alveolar cementum." (Fig. 7.) This includes all pulpless

teeth having pyorrhea to the extent of pocket formation. In such cases there is generally a pathway of drainage established from the periapical area to the gingival margin, which can often be

Fig. 7.



Apical pericementum—(*a*) Inflamed. (*b*) Undergoing destruction. (*c*) Destroyed.

traced out in the radiograph. Attempts to sterilize such teeth invite failure, as constant reinfection will take place.

GROUP III.

Here are placed "Teeth having their apical openings within the maxillary sinus." When the pathfinder is passed through the apical foramen in certain upper bicuspids and molars, there is a twinge of pain after which the instrument moves upward without resistance or pain. This is an indication that the antrum of Highmore has been invaded. The radiographic film is of little use in confirming this point. It is probable in most cases of this character that an infected granulation tissue has been substituted for the normal lining membrane of the antrum about the root-apex. Prognosis in this event is most unfavorable, as reinfection is almost certain to occur.

We are confronted, then, by the prospect that the only teeth which offer opportunity for a favorable prognosis are those in class 1, periapical disease, a very few in class 2, and those in which the periapical conditions are still normal. Even when we thus limit our field of endeavor we are given but little encouragement by the studies of Price and Brooks, but, in the light of the almost universal failure of our past performances, these possibilities should be given serious consideration. The faint-hearted may become discouraged, but our professional duty to our patients is to face the facts and restrict our treatment to those cases where successful termination is within the bounds of reason. Then when an auspicious result is indicated by a bacteriological test, the root-canal may be filled, with a clear conscience.

EXTENT TO WHICH CANALS SHOULD BE FILLED.

Provided the root-canal has been properly prepared to a conical form, the filling operation is not one of great difficulty, but it is necessary that some judgment should be used as to the limitation of the filling. The desire of conscientious men to surely fill the canal to the end has led in many instances to grotesque overfilling, which at best serves no useful purpose.

The amount of filling material, if any, which shall be forced through the apical

Fig. 8.

opening depends on the extent to which the cementum has been denuded of its life-giving membrane. (Fig. 8.) In some cases of class 1, and cases where there is as yet no periapical destruction, the line of the pericementum, as disclosed by the radiograph, is continuous. In such teeth, to be ideal the filling should stop at the apical extremity of the canal. (Fig. 9.) It may be wise to here again call atten-

tion to the fact that most canals terminate in a crater-like depression in the cementum. For the purpose of root-filling this should be considered as an integral part of the canal. The radiographic evidence of a perfect filling in such event will indicate a little ball at the root-apex. (Fig. 10.)

Wherever denuded apical cementum exists, the attempt should be made to cover this with a cap-like film of chloro-percha (Fig. 11), but in no event is it necessary or even desirable to project a solid gutta-percha point beyond the root-end. A careful study of the radiograph will indicate the amount of filling material which will be of benefit beyond the canal proper (Fig. 8), and by different methods of inserting the filling this amount can be controlled to a reasonable degree.

Fig. 9.

Fig. 10.

Fig. 11.

Fig. 9: Correct filling after recent devitalization.
Fig. 10: " " " " " without periapical destruction.
Fig. 11: " " " " " associated with periapical destruction.

THE TECHNIQUE OF ROOT-CANAL FILLING.

If the requirements call for a filling confined to the canal, the technique is as follows: The canal, enlarged and shaped to a conical form, is flooded with a chloro-resin varnish, somewhat thicker than that recommended by Callahan. A fine cone is introduced and passed toward but not quite to the root-end, and dissolved by a stirring, *not* a pumping motion. This will coat the canal walls with chloro-percha, which will be extra-adhesive on account of the mixture of resin, for which purpose, only, the latter is used. A somewhat larger cone is now selected, but not so large as to impinge on the canal walls in its passage to the apex. If the apical foramen has been enlarged it is usually better to cut off the extreme point of the cone. The cone so selected and prepared is dipped in resin varnish and is slowly insinuated through the canal almost to the end.

At this stage time must be allowed for the chlorform to be dissipated before progressing with the operation. This will be caused partially by evaporation and partially by combination with the gutta-percha of the cone, so that as the chloro-percha becomes thicker the cone becomes softer, until the whole mass in the apical third of the canal is of about the same consistence. When the gutta-percha at the coronal orifice is as plastic as unvulcanized rubber, a blunt plugger, too large to go far into the canal, is slightly warmed and used to gently pack the filling material toward the apex. At the first suggestion of pain the packing should cease. A fine plugger which will pass freely into the canal is now warmed and carefully passed through the center of the filling until it reaches the apical third of the canal. It is then moved about in such a manner as to pack the filling material against the side walls, after which the deficiency thus caused is filled with a suitable gutta-percha cone, packed to place.

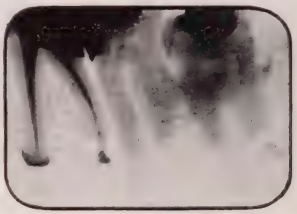
If the radiograph shows the filling to be incomplete, this can be corrected, at a subsequent sitting, by placing a drop of chloroform in the pulp chamber and passing a root-pick through the filling toward the apex until pain is experienced, and then packing a cone in the opening thus made.

The tendency however, is to overfill rather than underfill the canal. This can be guarded against, first, by the stirring motion in making the chloro-percha, which should be limited to an amount sufficient to coat the walls only; secondly, by inserting the prepared cone in such a manner as not to force the chloro-percha ahead of it, and thirdly, by patiently waiting for the whole mass in the farther end of the canal to become homogeneous.

In the majority of cases, fortunately, because it is more easily managed, the filling material should pass beyond the canal to cap the denuded root-end. Depending upon the amount required for this purpose, the canal should be lined or even filled with chloro-percha in the manner already described, only now the cone should be dissolved with a pumping motion, as many cones being thus used as may be necessary to furnish a suitable amount of this semi-fluid substance. A cone is then selected which will approximately fit the canal. This is dipped in chloro-resin and gently pumped through the chloro-percha to the end of the canal. During these pumping operations there will often be slight twinges of pain, but these are caused by the irritation of the chloroform and must be disregarded. When the cone finally appears to have reached the end of the canal, time must be allowed for the chloroform to diffuse, but not so long as when it is desired to confine the filling to the canal. Usually, when the blunt end of the cone is somewhat plastic, if pressure is brought to bear the point will not be solid enough to penetrate tissue, but will pass through the apical opening at such consistence as to distend the granulation tissue and flow in the direction of least resistance, or in other words, fill the space where tissue is missing. It is possible that the natural elasticity of the granulation tissue will have a tendency to force this gummy mass back toward the denuded cementum. This may be further assisted by making pressure on the crown of the tooth with the finger, or better, by allowing the patient to bite hard with the tooth on an ordinary lead-pencil eraser.

The amount of filling material passed through the apical opening may be controlled, first, by the amount of chloro-percha formed in the canal; second, by the gradation of the pumping motion in dissolving the cones, and third, by the consistence of the mass when pressure is exerted. If too soft the chloro-percha will run off into the tissue. If enough time has not been allowed for the tip of the cone to soften, this will pass through and penetrate the tissues, often forcing the chloro-percha ahead of it by its piston-like action. (Fig. 12.) By studying the foregoing features I believe that it will be possible to so perfect this technique that practically a predetermined amount of gutta-percha can be extruded, and that in most cases it can be confined to the immediate utility of capping the root-apex.

Fig. 12.



Filling in mesial root caps a large denuded area of apical cementum. Filling in distal root projected by too precipitate pressure forcing the chloro-percha ahead by its piston-like action.

My knowledge of the adhesion of such cappings is limited to two cases where the teeth were extracted several months after the insertion of the fillings. In both instances the cap was very adherent to the cementum and as hard as vulcanized rubber.

From what has been said it is evident that the present status of root-canal work is not all that could be desired, but the writer has cast his lot with those who

insist upon sifting this question to the end before becoming either over-optimistic or discouraged. It is possible that, after all, the effort of dentistry to find a means by which badly infected teeth can be restored to health may result in failure, but this is no reason for weakly surrendering the endeavor. Rather, with scientific impartiality let us continue the investigation of this problem until we arrive at the truth.

Meanwhile, it is likely that an increasing number of pulpless teeth will be condemned to the forceps, and that the apparently retrogressive plea of Broomell for the devitalization of the pulps of sound teeth will appear more and more rational. For many years the dental profession ignorantly destroyed normal pulps in order to make bridge abutments more secure. The disclosures by the dental radiograph of the periapical conditions which supervened gave the profession such a shock that now the conscientious dentist looks with fear and trembling upon the necessity for such an operation. And yet, until some more satisfactory abutment for vital teeth is devised, the demand of an educated public for removable bridge-work will continue to make pulp devitalization necessary.

In view of the holocaust wrought by this agency in the past, how may it now be undertaken with safety? The crux of the whole matter lies in asepsis. Provided the pulp may be extirpated and the canal obliterated without introducing infection, no untoward result should follow. As in any surgical operation of choice, the prime consideration is the selection of cases in which conditions will not forestall a happy termination. Teeth with deep-seated decay, pyorrhea, or in close proximity to periapical areas of infection should be avoided, and preference should be given to teeth with unbroken enamel covering.

ASEPTIC PRECAUTIONS IN PULP DEVITALIZATION.

As a prerequisite to an aseptic operation, all instruments needed should be placed in an alcohol bath at least three minutes before being used. The operating table should be covered with a thick sterile towel, handled with sterile forceps. Napkins, small cotton sponges, cotton points, and smooth broaches wrapped with cotton, should then be taken from their wrappings with similar care and laid upon the towel, one of the napkins being used to cover the other dressings. To be acceptable it is essential that these must have been subjected to sterilization in the autoclave and kept securely wrapped until the last moment.

The tooth selected is isolated by the rubber dam, being certain that no possibility of leakage of saliva exists. The tooth or teeth in the field should now be rubbed with dry cotton or gauze to remove the mucus, after which the whole field, including the teeth, with dam and clamp, if any, is painted with tincture of iodin. After the iodin has dried it may be washed off with alcohol to lighten the field.

The exploratory opening is made with a small sharp round bur just taken from its alcohol bath with sterile forceps. When the pulp chamber is discovered a larger bur is substituted, so that direct access may be had to all canals. This step should be carried forward in a calculating manner, as it corresponds to making the primary incision in any other surgical operation. The object here is the safety of the root, and as much of the crown should be sacrificed as may be necessary to prevent the possibility of failure.

The pulp having been freely exposed, all débris is cleaned away with alcohol. A fine smooth broach is used to explore the canal, the pulp extirpated, and the canal enlarged. Repeated washings with hydrogen dioxid, using the cotton points or cotton-wrapped broaches as swabs, will remove all the blood and débris and leave the canal walls clean. The canal is then dried with cotton points, and as a superprecaution against the possibility of infection having been introduced, electrolytic medication may be used to the constant of 30 as recommended by Prinz.

A strand of picture-wire, wrapped with cotton and placed in apinol prior to the operation, is now passed into the canal

and sealed there with gutta-percha rendered sterile in the flame. A radiograph is made and studied as a guide to the length of the canal. No attempt should be made to fill the canal while anesthesia persists, otherwise there will be an almost unpreventable tendency to overfill the canal, which in this instance could surely accomplish no good purpose.

The gutta-percha points used should be dipped in tincture of iodin and allowed to dry. After being washed in alcohol they should be kept in alcohol in a suitable container. Just before the filling operation they are removed from this bath with sterile forceps and placed upon one of the sterile napkins to dry.

The anesthesia most satisfactory for this work is obtained by slow subperiosteal injections of cocain immediately over the root-end. Pressure anesthesia is contra-indicated, and conductive anesthesia is not complete in all cases.

In closing this paper I desire to acknowledge my indebtedness to Drs. Kinyoun and LeComte of Washington for their many valuable suggestions and earnest co-operation in the study of culture methods and culture media as referred to herein.

1424 K ST., N. W.

[See also *Discussion*, as reported under "Proceedings of Societies," this issue.]

The Next Quarter Century in Dentistry:

A Prophecy Based on the Needs of the Profession and on Our Hopes for Its Development.

By W. D. TRACY, D.D.S., New York, N. Y.

(Read before the Dental Society of the State of New York, Saratoga Springs, June 13–15, 1918.)

THE rapid evolution of dentistry as a profession from the establishment of the first dental college at Baltimore in 1839 to the present day has been stable and full of interest from every point of view.

Medicine, always jealous of her prerogatives, and justly so, did not welcome, nor did she assist in the birth of dentistry, but on the contrary, was quite antagonistic to the foundation of a dental college, and those far-seeing and courageous pioneers, Harris and Hayden, in spite of rebuff and discouragement had to fight the early battles of professional dentistry unaided by their medical *confrères*.

The fact that the broad gulf of prejudice and even of distrust that used to separate medicine and dentistry has been steadily growing more narrow indicates a splendid progress on both sides. It shows that the master minds in dentistry have realized the necessity of giving dental students the broadest possible medical foundation for their dental education. It shows that medical men have awakened to the fact that teeth are really a part of the human economy. They have grown into a realization that the teeth in health and disease bear the same relation to the body as do other organs.

Coincidently the dental profession has been made to realize most keenly the fact that in dealing with the teeth and diseases of the oral cavity they are assum-

ing the same responsibilities as does the surgeon who operates on other parts of the body.

DENTAL EDUCATION.

In 1839 there was one dental college which graduated two men, and now at the end of seventy-nine years there are 47 dental colleges and schools of dentistry in the United States. The time necessary to acquire the dental degree has lengthened from a course of a few months to the present requirement of four years.

In the early years of dentistry the successful man could skilfully encompass all branches of the work, whereas today the field of dentistry has become so broad and embraces so much that no man can become expert in all departments, and the profession is naturally dividing up into specialties.

The materials used and the methods and theories of practice have almost all undergone radical development and radical changes as the penetrating light of science has illuminated the pathway of dental progress.

The wonderful growth of the profession since its birth impresses upon us the great possibilities of its future expansion. With the impetus it has already gained it is only natural to believe that its further development will be even more rapid, and that the scope of dentistry and its use and value to humanity will be materially enhanced with each succeeding year, until one day it will be one of the most important, if not *the* most important, special field of work in the practice of medicine.

For mere man to prophesy what developments will take place in dentistry in the next twenty-five years were vain; but basing our reasoning on the remarkable growth of the past, it may be interesting at least to set down our present impressions concerning what may take place in the future.

That the institutions of dental learning are the very foundation of the profession and of its future development is a truism. It is safe to prophesy that the requirements for entrance to these institutions will be increased from time to time as the curriculum itself becomes more taxing on the mind of the student, because the individual not provided with a good fundamental education and not well grounded in the habit of study will be unable and mentally unqualified to encompass the work provided by the curriculum.

It is quite possible that many of us may live to see the day when matriculants will be entered as dental students only when they have finished a four-year collegiate course, and by the same token a quarter of a century may not have elapsed before all graduates in dentistry must first have obtained an M.D. degree.

In this connection the following quotation from Professor Edwin T. Darby, who for forty-one years has been an active and potent factor in dental education, will be of interest. He says: "It is my opinion that the day is not far distant when the student of dentistry will graduate as an M.D.; but one degree will be conferred, and that will be Doctor of Medicine. And it should be so. The dental student must now spend four years to prepare himself to practice one branch of the healing art, and the medical student spends no more time, and is granted a degree which permits him to practice all branches included in the medical course. The medical and dental professions are gradually coming nearer together, and the gap between them is so slight that in time it will be closed, and the relations between the man who practices medicine and the man who practices dental surgery will be of the most intimate kind—and it should be so, for reasons which need not be mentioned."

PREVENTIVE DENTISTRY.

The dental mind has for many years been applied to the study of prevention of dental diseases, and with certain limitations preventive dentistry is an accomplished fact in the present day.

The systematic prophylactic treatment of children and youthful patients, as well

as of adults with restored or cured cases, has proved its value as a preventive measure, and it is now an established part of the work in every well-regulated dental practice.

What has seemed to be the most overwhelming problem faced by the dental profession is the care of the teeth of the millions of school children in this country. The economic waste and the actual cash loss due to ill health and mental deficiency caused solely by dental disease and defects in all large municipalities is too well recognized to need reiteration.

While preventive dentistry is applicable to patients of all ages, its most important field of usefulness is perhaps in its application to the school children, and in several sections of the United States the systematic prophylactic treatment of public school children has been carried on with the most salutary results. Preventive dentistry as applied to the school children of our country is really in its infancy, but the present indications warrant the prophecy that during the next twenty-five years the development in this special field of work will be so great that every school in the country will be obliged by law to provide prophylactic treatment by properly trained dental hygienists for the children under its control.

It is quite possible that in isolated sections where the population is scattered, rural automobile dental clinics will make their periodical rounds under state control to minister to the dental needs of the school children and others who cannot go to the larger towns for treatment. This plan has already been initiated in Vermont, and possibly in other states.

In view of the important work done by Dr. Alfred C. Fones of Bridgeport in making preventive dentistry in the schools of his city a reality, and because of his years of study on this and allied problems, his opinion is worthy of record and is quoted as follows: "It is much easier to prophesy the result that may be attained in preventive dentistry in a quarter of a century than to attempt to outline the probable stages through which it will pass in securing that ultimate result. The efforts of our profession will be concentrated upon the prevention of dental caries and pericemental infection from the gingival border. The two great factors that will control these diseases are proper food and prophylaxis."

The dentist will become an educator instructing his patients in matters of diet conducive to normal mouth conditions and bodily health. His greatest field for service will be among the mothers of small children, who will learn of the practical elimination of free sugars, white breads, crackers, etc., and that the substitution of simple, wholesome, hard foods will help to produce the ideal arch development and reduce the tendency to dental diseases. The beginning of this education of the public as to proper foods is made practical, even at the present time, by the war situation, which has forcibly eliminated the use of a good part of the free sugars and white breads from the diet. Until this slow educational campaign has made itself felt, the most rigid system of prophylaxis and habitual daily mouth cleanliness must be carried out to overcome the evils of our present form of diet.

The medical profession, as well as the general public, is slowly realizing the great importance of sound teeth and healthy mouths to general health, and this knowledge will become so widespread that a National Department of Health, of which dentistry will be a very important part, will be created to help produce and maintain health. The value of prevention over cure is already realized to such an extent that every health activity is being carried on along lines that tend to prevent disease.

The National Department of Health with its own secretarial bureau will find it within its power to compel scientific feeding and care of the body by enforcing the pure food laws and restricting the manufacture of candies, confectionery, etc. The necessity for this restriction is made apparent by the statistics secured in the examination of thousands of mouths of men drafted into the national army. These show that the Italians, with a national consumption of

but thirteen pounds of sugar per capita per annum, have teeth in which dental caries is the exception rather than the rule, in contrast to the mouths of the boys of America, whose average consumption of free sugar is about ninety pounds per capita per annum.

It is my belief that the great educational and preventive work will be carried on by an immense corps of dental hygienists in public schools, hospitals, and other public and private institutions, aside from those employed in private practice. The educational and preventive dental clinic for public schools will be universally adopted, and although municipalities may conduct reparative dental clinics, they will be separated and apart from the school buildings. In 1943 fully 30 per cent. of the school children will be free from dental caries, and many of the diseases of childhood will have been stamped out. A toothache will be generally understood as a calamity, as it will usually mean pulp involvement, and for the masses this will mean extraction. Focal infections of the teeth will have long since been acknowledged as an important source of systemic infections, and the dental practitioner will be obliged to be a medically educated man in order that he may have a greater knowledge and broader vision of dentistry, which will be recognized as the most important specialty of medicine.

In spite of all the preventive dentistry that can be accomplished during the next twenty-five years, the profession at large will still be constantly occupied with curative and reparative work in the mouths of people who did not come under the influence of compulsory dentistry as children, or who were personally neglectful of their mouths and teeth after reaching adolescence.

We naturally ask, "What will be considered good practice twenty-five years hence in dealing with a tooth in which the pulp has lost its vitality or which suffers an exposure of the pulp through the removal of deep-seated caries?"

The idealist would say that if all the plans advocated by the champions of preventive dentistry could be put into effect at once and carried out systematically through the next quarter century, there would be no exposed pulps, and therefore no problem in connection with devitalized or infected teeth.

FOCAL INFECTION.

The dental millennium, however, will not be reached so soon, and pulpless and infected teeth will still be among the problems with which the busy practitioner will have to deal. Cases of this kind will occur much less frequently in the future, of course, than they do today, and just what the attitude of the profession will be toward the cases of fresh pulp devitalization and cases of putrescent pulp is a matter of some conjecture.

Opinions on this point are many and varied. Some of our most careful thinkers and men of conservative speech have been heard to say that within five years no tooth with any form of pulp involvement would be permitted to remain in the human mouth, the ground for this assertion being the assumption that a pulpless tooth must necessarily be an infected tooth even though the vital pulp were removed under modern aseptic methods and the canals were thoroughly opened, sterilized, and filled according to the accepted procedure of the present day.

We have sufficient light upon the relation that focal infections about the mouth and teeth bear to the general health, to make us realize the danger of retaining teeth so infected. But, to offset the pessimistic view quoted in the previous paragraph, there are others who are equally thoughtful and conservative and whose wide experience entitles them to speak with some authority, who feel that the tooth from which a freshly devitalized pulp is removed can be treated and filled in such a manner as to be safely retained as a healthy and useful dental organ, and the writer of this prophecy is a supporter of this latter view.

While we admit that the prevention of dental caries and other diseases of

the teeth is the shining goal toward which the profession is working, we must acknowledge also that our much-talked-of scientific development falls far short of our ambitions if we are unable to so treat teeth with freshly devitalized pulps that they may be safely retained.

BRIDGE WORK.

There can be no doubt concerning the ruthless devitalization of dental pulps in sound teeth for the purpose of anchoring fixed or other types of bridge work to them. This practice, which has been accepted by many as being in the best interests of the patient, will be abandoned in time, and ways of supplying the missing natural teeth will be devised which will not necessitate devitalization.

Fixed bridge work will be used less and less as the rank and file of the dental profession become awakened to its inherent defects and devastating influences, and there will be a renaissance of the removable denture.

In regard to possible changes which may take place in the methods of filling teeth between now and 1943, it may be said that there is nothing in sight on the dental horizon at the moment which indicates any marked change or radical improvement in methods of filling teeth.

SILICATE CEMENTS.

In 1890 Dr. Ottolengui wrote a sort of prophetic story which appeared in the *Dental Review* for January of that year, the theme of which was "Dentistry in the Year 2000." Among other interesting things in this story it was related that in 1970 a man named Erickson had produced and presented at one of the international conventions a plastic filling material which could be softened by low heat and placed into the cavity as we would insert gutta-percha. When set, this material was as hard as tooth structure and would permanently retain a high polish. It was obtainable in all shades so that teeth could be very perfectly matched.

If we could be assured of having such a material for our use, many of us would be glad to stay around until 1970 to have the pleasure of using it! No one dares say that we may not have a perfect universal filling material supplied for our use even before 1970, but certainly it has not yet been presented to us.

While we have welcomed the silicate cements of various names and used them in the various parts of the mouth, we have had it borne in upon us repeatedly that even the best of these materials cannot be classed strictly as permanent fillings—neither can the silicate cement filling be universally used on all surfaces of the teeth. In other words, they are fillings limited in their field of usefulness and in their period of durability; but until we find some better material we shall continue to use these silicate cements in a certain class of cavities.

THE GOLD INLAY.

Bearing on this subject and upon the gold inlay and the foil filling, Dr. Darby's comment is again interesting and illuminating. He says, "I predict that the dental profession will soon return to the use of gold foil for filling cavities of moderate size. We have learned that the silicate cements are not lasting. The fillings that have lasted twenty-five and fifty years have been made of gold foil or other forms of gold and have been placed in the cavity by laborious effort, and for that reason, among others, the profession has been quite willing to fall away from its use. It is true that gold has serious objections, such for instance as its inharmony of color and the labor incident to its placement in the cavity, but it has so many advantages over the plastics, that I predict that its use will become more general. The gold inlay has undoubtedly come to stay, but in small cavities on occlusal surfaces foil fillings are better. All silicate preparations must be regarded as temporary, and were it not for the esthetic quality they possess they would soon become less and less used by the dentist who has for his object the permanent quality of his operation."

While there are at present several special fields of work in dentistry, it is prophesied that, within the next few years, specialization will be even more marked than it is today, and that men having special interest in or special skill in a certain line of work will devote themselves exclusively to that department and will be known as specialists.

Organized dentistry represented by its various local and state societies and by the National Dental Association is bound to become stronger with the passage of time, and next to the institutions of dental learning it will be the most potent factor in the elevation of dental standards. The only changes that are anticipated in the dental societies during the period supposed to be covered by this prophecy are those which will incidentally occur in increasing the efficiency of these organizations and rendering them as democratic in their administration as possible.

ARMY DENTISTRY.

The need for more dentists in the United States army is so palpable that it would seem almost impossible for the Congress to fail in its duty in this matter, and it is prophesied that in 1943 there will be at least four dentists for every thousand men.

The conditions which make it difficult to enact national laws regulating the practice of dentistry uniformly in the several states will undoubtedly change with the passage of time, and it is prophesied that ultimately there will be a Federal law which will control and regulate the practice of dentistry throughout the country. It appears to the writer that such control is simply a matter of educational development, and that the benefits of national regulation would be numerous and quite obvious.

While the growth of dentistry has been very rapid and far-reaching in its effect, and on the whole satisfactory to those most interested, what can we say of the mental attitude of the rank and file of men who make up the profession, and from whom we have so often heard the clamorous call for professional recognition equal to that given to our brothers in the practice of medicine?

Have they grown along with the profession itself, or have they clung to a rather narrow range of vision and retained a too materialistic attitude? As dentistry has grown, and as its importance as a factor in the health of the nation has been recognized and acclaimed, has the dentist become more professional in his habit of thought and in his relations with the people of the community in which he lives? Has the spirit of service and the feeling of altruism penetrated to his heart, and has he shown by his relations with humanity that he is the true professional gentleman which he wishes the world to believe him to be?

These questions will not and should not be answered here, but the writer, with all the optimism that he naturally feels in connection with the development of dentistry, ventures the prophecy that within twenty-five years there will be many expressions of professional feeling that are not in evidence today.

46 W. 51st st.

The Needs of Prosthetic Dentistry.

By NORMAN S. ESSIG, D.D.S., Philadelphia, Pa.

(Read before the Maryland State Dental Association, Baltimore, June 5-7, 1918.)

PROSTHETIC dentistry combines engineering and art in very subtle proportions, and, as is the case in every other instance where either of these is employed, much preliminary study is required before the first or fundamental steps can be taken.

If the dental profession is not willing to spend as much time as is necessary to accomplish the best results possible in prothesis, they have not the best interest of their patients at heart, and should not therefore undertake that particular kind of dental service.

If we are not willing to spend as much time as is necessary in the preliminary steps, our patients will require us to do so in the final adjustment or in the reconstruction of the work.

In presenting the subject of the selection of artificial teeth and the harmony produced thereby, I have endeavored to effect a rather radical transposition, and to depart from present methods as far as the old principles will allow, without disturbing the fundamental sequence of events.

In other words, the attempt has been to place the selection of artificial teeth, and their manipulation, both before and after their adjustment in the human mouth, as nearly as possible on the same basis as the natural teeth in their evolution and development of form and arrangement in the human skull. Consequently, the formula for the method employed to bring about results of the greatest value should follow along and compare to the true scientific and physiological laws in order to produce results, by artificial means, commensurate with those obtained by the processes of nature. In other words, a synthetic form and outline is obtained bearing a direct relation to the combination of basal types, but maintaining its greatest relation or resemblance to one of these, which we shall call the base.

Like any other creative process, however, there must be a basis of operation upon which the structure is to be built, and which is to form the basis of subsequent calculations. This is also true of the natural development and eruption of the natural organs of mastication. It would therefore be most logical to ask ourselves the question, Upon what does Nature base her system, and what physiological process obtains in the normal human being with regard to dentition?

We find that the capsule from which the human teeth are formed develops, matures, and pushes itself into place governed and limited by the surrounding bony walls within which this development takes place, and that the size and shape of the fully developed tooth and its final alignment is dependent largely upon the space allotted to it and the influence exerted by cusp formation; this is especially true in the case of the lateral incisors, which are more than likely to bear little relation to the type represented by the centrals.

Even a superficial summary of a part of Nature's method will more than account for the fact that the human teeth are a law unto themselves, though this digression eventually becomes almost rhythmical in method and recurrence.

THREE BASAL TYPES OF TEETH.

It has been found as a result of systematic research that the teeth of man

owe their present form to the blending of three primal or basal types, which in their purity conform to the rectangular, pyramidal, and rhomboid, and which may be found throughout the world regardless of race or environment.

Having taken these points into consideration, let us see how we may apply just these conditions to the formation of porcelain teeth.

In the selection of porcelain teeth for an artificial denture, especially in the case of edentulous persons, much time must be spent in the contemplation and analysis of the face. No man can quickly scan the face of his patient, and conclude at a glance just what type and arrangement is indicated. Therefore, any method which holds out such ideas is misleading to say the least.

Anyone who has been deprived of the natural organs of mastication for any length of time has generally worn artificial substitutes, and it is therefore always advisable that a consultation appointment should be given with the idea of studying the face and noting the requirements of the case, in order that a readjustment or a harmony be re-established which will blend the arrangement of the artificial teeth with the lines of the face, so that attention will not be attracted to the fact that there has been a dental service.

It is undoubtedly true that often it is desirable or that a face demands a blending of the basal types to produce the required harmony; it is also true, alas! that this fact in many instances is either not recognized or is disregarded altogether in the selection and adaptation of porcelain teeth.

We may conclude that if we ourselves are to produce appropriate blendings as a result of the study of any given face, we can do so to a much better advantage by starting the procedure with a strong and pure type of tooth, and specializing a modification to suit the case. This is only what has taken place in the original condition, and many times what we regard as a harmonious condition is but a countenance whose identity has become established by reason of the natural arrangement of the teeth and the effect they have on the face and its expression. Therefore, while we must not neglect the individual tooth and its anatomic variations, we must regard the six anterior teeth as a unit. This is how Nature has been able to use any of the three types whenever she pleases, and produce harmony.

These variations from the harmonious and symmetrical are what may be designated as "harmonious discords," and can only be recognized by the establishment of the bilateral symmetry accomplished by the comparison of the two halves of the face between certain established lines. Therefore, that portion of the face which is most characteristic, and at the same time nearest to the teeth themselves, should be selected, because this area is less affected by high-light, shadow, style of wearing the hair, etc. The discordant element which enters into the question must be applied after harmony has been recognized.

For this reason the area I have established for my convenience is from the eyebrows to the commissure of the mouth, with the median line vertically through the nose and at right angles with the horizontal lines, which are parallel to each other.*

It should be borne in mind that what we often select as an example of harmonious discord, or an individuality, is but the result of a digression from the symmetrical and ideal, and the effect that such a condition must necessarily have on facial expression, and therefore, if possible, it is our function to restore this unusual or characteristic individuality, and, like all reproductions of nature, it is an art of the highest type.

If it is not possible to restore the mouth to what it was originally, we may serve the patient and do ourselves credit by restoring the organs of mastication in an alignment of the teeth similar to that which is in the mouth of someone else, providing we do not distort or disfigure the lines of the face by so doing.

---

* See "Type *vs.* Temperament," etc., DENTAL COSMOS, vol. lix, 1917, p. 1110.

The patient will have to get accustomed to an unusual condition in any event, so that our efforts should be directed along artistic lines, and the conventional regular alignment should be discarded.

I should like at this point to revert to what I said regarding digressions from the harmonious. This particular phase of the subject sometimes becomes almost a local or sectional characteristic, and proclaims at times the part of the country from whence a person comes. This is amply exemplified in those coming from the north of Ireland, where a peculiar wedge-shaped arch and overshot appearance is more than common. This peculiarity may embody any of the true types.

The two central teeth, which may be said to establish the type indicated, should be in conformity with the portion of the face confined within the lines indicated above; and not only should the outlines suggested by this method be adhered to, but modifications of profile of the teeth should also be made to conform them to the general contour of the face.

VARIATION IN LATERAL TEETH.

A very logical explanation for the great variation in the lateral tooth, and the fact that in many instances that tooth does not maintain the type of the central teeth, is that in its developmental stage the room allotted to the capsule is often curtailed by reason of the robust character of the central incisors and the cuspids; so that it might, therefore, be said of this tooth that a part of its function is to fill the space between its more vigorous neighbors, and also to blend or harmonize the lines of these dissimilar teeth, whose form and function is widely different.

There is, of course, a typical lateral to be found in well-developed dentures which is an ideal companion to the truest type of central, where development has been ideal and uniform. Harmony, however, is not marred by the insertion of almost any type of lateral whose width is appropriate, and individuality is often obtained by modifying the lateral incisor to suit the case in hand.

The cuspid or canine tooth is a most important one, and great character, or a lack of it, can be produced by the appropriate placement of these teeth, which no doubt have more than one function to perform, apart from the fact that they have their use in the preparation of food, or, as in the lower animals, as a weapon of offense or defense. The canine is also a great stabilizer, and by reason of its strong roots acts to reinforce the arch at a point where the roots of the adjoining teeth are widely different. Therefore, in maintaining the sequence of events and the ideas around which these methods have been established, a typical and robust form should be adopted, so that modifications at any point may be made, and the harmonious draping of the anterior teeth maintained and completed.

Heretofore we have been in the habit of filling a given space by selecting six anterior teeth with appropriate bicuspids and molars to suit the case. As a matter of fact, artistic effect is greatly increased by selecting the two central incisors separately with a view to type, and two cuspids which shall denote character. After having aligned them on the arch a modified lateral whose proportions are governed entirely by the space left for it is placed in position, because by so doing we have only done what nature does.

Inasmuch as artificial teeth of porcelain are the means by which we reproduce the natural organs of mastication which are designed and arranged by an all-wise Creator, whose plan, though it has been modified by man through his failure to observe certain laws, we would do well to follow, in this sequence and plan, in the system by which we select and arrange our porcelain substitutes, because we have to restore a condition the responsibility for which must ever remain with that Supreme Designer whose method will forever obtain, and whose wisdom we may not dispute.

Reverting to the discordant elements which must evolve in the process herein described, it might be well to dwell upon the phase of prosthesis a little more in detail.

We have said that harmony should first be established; this is true according to our formula, and is verified by the examination of cranea which show clearly the natural, physiological process. Orthodontists claim that there is a method of calculation which will produce the normal arch and alignment in each case that presents itself. This would lead us to believe that nature established a harmony, and then departed therefrom. Let us therefore do the same. Let us select the teeth with a view to a certain distortion later which shall conform to the irregularities which confront us. We therefore select the types we desire from any of the three basal forms, and consequently regard the face of our patient with the view to distorting the form and alignment of the teeth selected, so as to produce a harmony of line and contour in keeping with the face, regardless of how irregular it may be.

. We must determine whether we wish to produce an appropriate degree of age and wear by cutting the tooth at the incisal edge, by exposing the neck, or by a compromise of both. It is only in rare instances that there is not considerable elongation in elderly persons, and unless there is a marked overbite, occlusal wear is manifest to a greater or less degree. Approximal wear, while not so apparent, is generally evident upon close examination of those fifty years of age or older.

The foregoing may be classed among the discordant elements in the process by which we will endeavor to keep pace with nature.

USE OF THE ARTICULATOR.

The use of the articulator will be of great service, providing our instrument reproduces and maintains the movements established by the mandible and is one that is capable of producing an occlusal wear by persistent attrition like that which occurs in the mouth, and which is limited and influenced by the habits and physical capabilities of the individual.

These movements are controlled also by the bicuspids and molars and the radius of action permitted them by their cusp formation and general alignment, which either allows or precludes clearance laterally.

It will be noticed, when we examine a mouth having good articulation, that wherever a tooth has a marked projection in cusp formation, a compensation for that prominence is made in its antagonist by an indentation, or a semi-approximal surface which is shared in good proportion by the two opposing teeth, forming little occlusal planes which are separated by the triangular ridges typical in bicuspids. It is just as much a part of our plan to follow nature at this point as at any other; therefore, we must again reproduce nature by making our masticating teeth also a reproduction of nature, with all the proportions to the smallest detail of their formation.

Reproductions of this kind in porcelain produce the most wonderful results, and such teeth are free from the interlocking feature which is most objectionable to the majority of patients. They also have a slight inter-occlusal space due to cusp formation, within which food may be held in small quantities without keeping the jaws apart during mastication. This feature allows the patient to thoroughly masticate, not merely to mash or bruise the food.

Great stress should be laid upon the fact that the one dependable and anatomical articulator is the combination of the upper and lower jaws of the patient. Inasmuch as great variation of form of the bony structure of the human head obtains in the human race, the individual, as he presents himself to us for a service, furnishes us with our only true guide to the correct relation of that particular mandible and maxilla. The articulator must therefore be only an instrument to maintain movement and relation in the absence of the patient.

The jaws of an edentulous person have no path or track upon which to functionate or guide them in mastication, as is the case with those who have teeth, and while it is possible for anyone to get accustomed to an inferior form

of denture, and in time get some degree of service therefrom, our plain duty is to come as close to the natural state as we can by following nature's method in the creation and development of the organs of mastication, and the manner in which they are placed in the mouth in the human species.

1700 Locust st.

[See also *Discussion*, as reported under "Proceedings of Societies," this issue.]

Anaphylaxis in Connection with Asthma, Hay Fever, and Various Skin Diseases.

By J. A. TURNBULL, M.D., Boston, Mass.

(Read before the Connecticut State Dental Association, New Haven, April 18–20, 1918.)

ANAPHYLAXIS is the opposite condition from Phylaxis, or protection. It describes that peculiar train of symptoms which certain poisons exhibit, of increasing instead of diminishing the sensitivity of an organism to their action.

In anaphylaxis the chemical condition of the blood is altered by absorption of certain substances foreign to it, or a quantitative increase or diminution of some particular substance which has a right to be there. The action of the blood on the wall of the bloodvessels or nerve apparatus of the bloodvessels, or on the heart, is attended by an alteration of the vasomotor system; the substances which produce the changes are proteins or their derivatives, and are known as antigens; this gives rise to production of anti-bodies.

Vaughan* says, "All proteins contain a poisonous group which is identical or closely similar in action; this poison is a cleavage product, acid in reaction, capable of forming compounds and reacting much like globulins in its behavior to neutral salts."

All proteins, whether of animal or vegetable origin, possess anaphylactic properties for those individuals to whom they are sensitive.

Protein sensitization may be either (1) hereditary or (2) acquired. The hereditary form may be transmitted from the maternal or paternal side to the offspring, passing through several generations, or we may have omission in a number of generations, the sensitization later making its appearance in the offspring. It may show the same conditions in each of various forms of disturbances in different parts of the body in different individuals; that is, one individual of the family may have frequent head colds, another seasonal hay fever, due to pollen, or we may have two or more members of a family with seasonal hay fever, one of the spring, another of the fall type, while another may have both vernal and autumnal types; other members of the family may be troubled with disturbances of the lower respiratory tract, bronchial asthma and bronchitis. These may be seasonal and caused by the various pollens which produce hay fever.

In those hay-fever cases in which asthma occurs with the attacks, the asthma usually develops in the latter part of hay-fever season, and may continue for some time after the usual pollen period. This is due to the patient being saturated with the pollen protein, and to bacteria which the patient may be sensitized to during the attacks of hay

* Vaughan, *Journ. A. M. A.*, November 25, 1916.

fever, and to some food protein, as the pollen disappears which lessens the entrance of this protein. As gradual elimination goes on the attacks of asthma usually subside, but there are some in which attacks continue. These may be relieved by avoiding foods to which the patient is sensitive, or else by the use of a sensitive bacterial protein.

Acquired protein sensitization may be produced by injection of foreign protein, or through the influence of some intercurrent disease or infection, as has been done with animals—namely, by injection of albumen in rabbits; after ten days they are not able to tolerate the same or a much smaller dose.

An engineer, age thirty-five, while at college under severe strain, received an infection of the hand and arm from which he was confined to the bed for several weeks. After recovery from the infection the patient noticed, at frequent intervals, outbreaks of urticaria; on testing, reaction to pork and grapes was found, also to staphylococcus pyogenes aureus.

Protein skin tests are made, whenever practicable, on the flexor surface of the forearm. If this surface is not suitable from some skin condition, as eczema, I use anterior surface of arm, extensor surface of forearm, anterior surface of thigh, back, or abdomen. The flexor surface of the forearm is preferable, as it is not so hypersensitive as the other areas.

For the tests, a sharp narrow-pointed scalpel, alcohol 70 per cent., gauze, solution of KOH $\frac{1}{2}$ of 1 per cent., and medicine dropper, are necessary.

The forearm is washed with alcohol, dried, and the area cleansed and covered with gauze. At a point 3 cm. below the bend of the elbow place a drop of the KOH solution with the dropper; through this moisture make an incision $\frac{1}{5}$ cm. in length just through the skin, being careful to avoid drawing blood. This will act as our control. Below this point (2.5 cm.), near the external border, place a drop, and continue placing drops across the arm at intervals of 2.5 cm. To the first drop add a small amount of protein to be tested. Mix with the scalpel and avoid irritating the skin. When the protein dissolves, make incision, through the solution, in the skin as with control, continuing the same process with the other drops down the arm. Reactions take place in from two to twenty minutes, and comparisons are made with control. Reactions show by redness, wheal, or wheal and redness. After thirty minutes the protein is washed off, and the reactions read and recorded.

Proteins causing disturbances may enter through (1) respiratory tract, (2) gastro-intestinal tract, or (3) action of bacterial proteins from absorption of some focus or foci. We may have more than one source of entrance of the sensitive protein, namely, (1) respiratory and gastro-intestinal tract, (2) respiratory and focal infection, (3) respiratory, gastro-intestinal, and focal infection.

There are a few sensitizations which show skin reaction, and produce symptoms by only one protein. Practically all cases show multiple sensitizations, that is, reactions to more than one protein. These proteins may have a closely related chemical combination, or a component part which is nearly identical in all of that class. As in case of one sensitive to vertebrate fish, there may be some protein with a factor common to a number of that species.

In patients sensitive to food proteins, omission of these foods from the diet is followed by relief of asthma and other anaphylactic disturbances. Another method is to omit the food from the diet and desensitize the patient to that particular food by giving small doses subcutaneously and gradually increasing the dose, avoiding too great a local reaction. Desensitization to foods is successful in many cases, though there are some we are unable to desensitize. Treatment with protein reduces the skin reaction, and sufficient treatment renders the skin test negative to that protein.

Patients with asthma attribute attacks to dust, odors, smoke, dampness, cold air, east winds, changeable weather, menstruation, exertion, excitement, indigestion, nervousness, and cold. These are all secondary factors, acting on a sensitive respiratory tract which has been

excited and rendered irritable by a sensitive protein. After removal of the cause and suitable treatment, these factors fail to produce attacks and the intestinal disturbances are relieved.

Hay-fever cases, due to the pollen of willow, alder, oak, birch, maple, apple, chestnut, grasses, rose, ragweed, goldenrod, cockle-bur, sunflower, can all be treated with pollen protein to which the patient is sensitive.

There are asthmas brought about by the inhalation of the protein of horse dandruff, dog, cat, rabbit, and guinea-pig dandruff, chicken feathers, and from various birds and fur-bearing animals. We can treat these by avoiding such inhalation; for instance, in case of sensitiveness to feathers of the pillow, by elimination of the feather pillow.

Blacksmith, age twenty-six; was subject to attacks of asthma, brought on when near a horse or driving a horse. If a small amount of horse's perspiration touched the patient's skin, within five minutes there would be redness and wheals. This case was treated with horse dandruff protein, so that he could be around horses without any attacks of asthma.

Superintendent of bakery, age forty-eight; began working at sixteen in a bakery. At eighteen years of age, when working with flour, he would be subject to attacks of sneezing, watery nasal discharge, lacrimation, itching of eyes, ears, nose, and throat. These attacks increased in frequency and severity for ten years. Then he would have attacks of asthma, which occurred at intervals and increased in frequency and severity. When forty-three years of age he could only work part of the day in the bakery. At forty-six, on entering the bakery, there would almost instantly be brought on severe attacks of asthma. This case gave positive reaction to wheat, rice, and corn; negative to oat, barley, and rye. By omitting wheat, rice, and corn from his diet he could work in the bakery without being subject to attacks of asthma. In this case sensitive protein entered through both the respiratory and gastro-intestinal tract. By omitting these articles from the diet the system was able to take care of the amount entering through the respiratory tract.

Oil dealer, age forty-six; suffered from asthma for three years. Reaction positive to wheat, negative to rye, oats, corn, and rice. Omitted wheat from diet, and in two weeks reported he felt better than for three years; no attacks. Two weeks later, no attacks. Following this for two days he ate six slices of wheat bread, which brought on the worst attack he had ever experienced.

Housewife, age forty-five; asthma for twenty years. Skin test made, and all the proteins that gave positive reaction were eliminated. After being free from asthma for three months, the patient was instructed to eat plenty of lamb, which gave positive reaction on testing. One lamb chop was eaten, and six hours after she had an attack of sneezing, watery nasal discharge, itching eyes, ears, nose, and throat continually for two hours. Frequent attacks for the next two hours. Forty-eight hours later two lamb chops were taken, and in six hours she experienced severe attacks of asthma lasting two hours, followed by frequent attacks of sneezing, with watery nasal discharge for eight hours; twenty hours later eczema appeared over the entire body. Avoiding lamb soon cleared up the condition. This case was later given lamb protein, subcutaneously, at weekly intervals, beginning with a small dose and gradually increasing the dose according to local reaction, until she was desensitized to lamb, giving no skin reaction. Since then she has been able to eat lamb without any disturbance.

Female, age five; at two months of age eczema all over the body, which continued to her present age. The skin was indurated, thickened, scaly and rough. The smallest amount of egg in the mouth caused immediate swelling of the tongue and the mucous membranes of the mouth and lips. Beef broth made the eczema worse. When at the seashore, if she should go near fish there would occur acute exacerbation of eczema. The patient gave positive reaction to wheat, egg, beef, haddock, and mackerel. These foods were eliminated from her diet and she was desensitized with wheat protein, and later with egg and beef. The skin became soft with very few scales, and resumed normal texture. The patient is now able to eat wheat, egg, and beef.

Female, age twenty-eight; has always known that some of the vertebrate fish, such as haddock, cod, mackerel, and salmon, would produce attacks of sneezing, nasal discharge, dry sore-throat, redness and swelling of the face. Within the last five years halibut and fillet of sole produced the same symptoms. This lady, on eating any of the fish, knows that these symptoms will occur in one hour.

All are aware of disturbances caused by strawberries and tomatos with some individuals.

In bacterial protein sensitization we can use the same skin test with the different bacterial proteins to determine which is the sensitive protein. No pains must be spared in searching for and removing every disease focus which serves as a focus of protein absorption. More than one avenue may serve as a source of absorption. The focus or foci may be found in the nose or accessory sinuses, tonsils, gums, teeth roots, gall-bladder, and appendix. After these foci are cleared one may have a chronic bronchitis, which can be cleared up by treatment with sensitive bacterial protein.

Female, age forty-two; eczema about the face and back of ears for six months. Test gave reaction to staphylococcus pyogenes aureus. I advised an X-ray of teeth, which showed abscesses at the roots of the upper left second molar. The tooth was extracted, the abscess cavities cleaned, and in ten days the eczema disappeared.

I have seen a few cases of cancrum oris patients which gave positive skin reactions to some foods. On avoiding these foods there was relief from the cankers. These are the cases which, when the dentist has attended to the teeth, are followed by severe outbreaks of cankers, for which the dentist is severely criticized by patient and friends, and in which he is accused of being unduly rough, or of using unclean instruments, while he is no doubt innocent, the contributing factor being present within the patients themselves, and ready for an explosion on the slighest provocation.

[See also *Discussion*, as reported under "Proceedings of Societies," this issue.]

Dental Clinics in Manila.

By LOUIS OTTOFY, D.D.S., M.D., Manila, P. I.

[Sixth Report.]

PREVIOUS reports of these clinics have been made as follows: Dental Cosmos, August 1910, October 1911, November 1912, May 1914, and July 1915.

The clinic at the Philippine General Hospital, which I succeeded in establishing in August 1912, has assumed large proportions. This clinic is now operated as the clinic for the School of Dentistry of the University of the Philippines, of which I am the director. The school was opened in 1915, and we adopted then the regular four-year course, hence our first graduates will receive their degrees in April 1919. At present the school has twenty-five dental students, and the classes will number about forty for the academic year of 1918–19. As the number of students increases and a larger number perform their practical work in the clinic, the higher class of work will increase. For the present, as is seen by the report, the largest amount of the service consists of emergency cases, that is, treatments and extractions.

Since the establishment of the clinic at the Philippine General Hospital (which is a public institution), the one at St. Paul's, the first one I founded thirteen years ago, has not been as active as in former years, but is still satisfactorily serving the poor in that section of Manila known as the "Walled City."

The clinic at Bilibid Prison, which I opened in 1906, was until lately supplied by my assistant from the St. Paul clinic, but recently the prison authorities have established a more regular and constant service, of which I have no record; hence

the dental work done in the prison far exceeds that shown in this report.

The largest gain in dental service since my last report was made in the public schools. In former years I maintained an irregular service in one of the schools, which could not be made permanent and efficient. Three years ago, I succeeded, with the aid of the then Secretary of the Interior, the Hon. Winfried T. Denison, in having a law enacted creating the Board of Dental Hygiene, which was authorized to collect funds for the purpose of establishing dental clinics in the public schools. It was much easier to get the law passed than to get the funds. Still, I was able to collect enough to open one clinic in the Meisic primary school, with over 3000 pupils—probably the largest single unit of a primary school anywhere to be found—which has been very successful, and is now established on a permanent and solid foundation, having been recognized as a necessity to such an extent that it now receives the financial support of the city.

In connection with that school I have also established a toothbrush drill. This was made possible through the generosity of the Florence Manufacturing Company, donating toothbrushes, and the Colgate Company, which donated tooth paste. During the past year only one hundred pupils, fifty each of boys and girls, have been admitted to the class. All of them are eager to enter it. The drill takes place every morning during a recess, and the improvement in the health and general demeanor of the children, and their application to the work of the schoolroom, has been so marked that the teachers of these pupils have noticed it and commented on it. I hope with the beginning of the coming school year to greatly increase the work in this direction.

Being unable to continue the clinic through the Board of Dental Hygiene, which depended on the uncertainty of begging money and aid (made more difficult on account of the needs of the great war), I succeeded in interesting the school authorities in the matter, with the result that the clinic will be continued by the city schools, and in July one dentist will be added. I have also seen by the report of the Director of Education that the appointment of a dentist in each province is recommended, and this, no doubt, in course of time, will take place.

Familiar with the various plans recommended for the conduct of dental clinics in public schools, I was in some doubt which policy to adopt. I have reached the conclusion that the preservative service—entailing hopeless expense—unless it could be made universal is of comparatively limited value; second, that the emergency service, coupled with the instruction, is of considerable value. Previous to the establishment of the clinic, in the fifty-odd rooms of this one school, there were from three to five pupils in each room at the very moment suffering with toothache (this, of course, is exclusive of those who remained at home on account of the same trouble). This means that from 150 to 250 children were at school in a condition of inefficiency, causing loss of time to the teacher, loss to the student, and loss to the citizen whose money supports the schools. This has all been remedied, and, by giving an opportunity for the children to get immediate relief, it has increased the attendance at the school. This service I consider to be highly valuable.

By the use of local anesthesia, I have encouraged my assistant to follow up the extraction of diseased roots and unsalvable teeth as much as possible, being satisfied that while the dental service is meager, this line of work probably yields the most in good results. The record shows that one-fifth of all the service consists of extractions.

But working along on a small scale—filling a few cavities while thousands of new ones are forming, extracting a small number of disease-breeding stumps and teeth while hundreds of others are rapidly passing into the same stage—sometimes makes one feel discouraged, when it is known that, were the means at hand, such an immense service for the general good could be accomplished. I am therefore, as a result of practical experience and observation, deeply convinced of the great value of prophylaxis

DENTAL OPERATIONS PERFORMED IN THE VARIOUS DENTAL CLINICS OF MANILA, P. I., FROM MAY 1, 1905, TO DECEMBER 31, 1917.

(*Under the charge and supervision of* LOUIS OTTOFY, D.D.S., M.D., *Manila.*)

Operations.	Philippine General Hospital.	St. Paul's Hospital.	Bilibid Prison.	Public Schools.	Other Institutions.	Grand Total.
Treatments	28,839	10,457	1,853	2,070	1,273	44,492
Extractions	8,884	7,544	1,444	1,915	292	20,079
Amalgam fillings	404	448	16	4,629	274	5,771
Cement fillings	110	456	35	1,078	109	1,788
Gutta-percha fillings	345	507	18	573	78	1,521
Gold crowns	142	638	116	. . .	3	899
Bridges	40	285	25	. . .	1	351
Cleaning cases	115	94	20	41	11	281
Vulcanite dentures	8	160	8	1	3	180
Porcelain crowns	10	97	. . .	. . .	. . .	107
Gold fillings	30	39	2	. . .	. . .	71
Vulcanite plates repaired	. . .	5	. . .	. . .	. . .	5
Richmond crowns	. . .	4	. . .	. . .	. . .	4
Regulating cases	. . .	3	. . .	. . .	. . .	3
Obturators, cleft palate	2	. . .	. . .	1	. . .	3
Prosthetic noses	4	6	. . .	. . .	. . .	10
" upper lips	2	1	. . .	. . .	. . .	3
" eyes and part face	2	. . .	. . .	. . .	. . .	2
" lower lip	. . .	1	. . .	. . .	. . .	1
" ear	. . .	1	. . .	. . .	. . .	1
Fractured mandible, treatment	1	. . .	. . .	. . .	. . .	1
Synthetic filling	1	. . .	. . .	. . .	. . .	1
Total	38,939	20,746	3,537	10,308	2,044	75,574

SERVICES RENDERED IN THE VARIOUS DENTAL CLINICS OF MANILA, FROM MAY 1, 1905, TO DECEMBER 31, 1917, INCLUSIVE.

Number of patients.

Philippine General Hospital	15,361
St. Paul's Hospital	8,886
Public Schools	3,032
Bilibid Prison	1,760
St. Luke's Hospital	336
Girls' Orphanage	73
School for the Deaf and Blind	18
Home of the Holy Child	14
Total	29,480

Race.

Filipinos	28,976
White	355
Chinese	80
Japanese	31
Hindus	17
Negros	12
Syrians	7
Turks	2
Total	29,480

Sex.

Male	19,198
Female	10,282
Total	29,480

—prevention rather than cure. This is so convincingly illustrated in the tooth-brush drill that it is impossible to escape conviction. The thoroughness in cleaning the teeth; the steady, dogged regularity, finally not only cleanses the teeth, but improves the diseased condition of the gums, and indeed retards the pus production about teeth and roots which should either be cured or removed.

In the "other institutions" listed in the accompanying table are included pupils in private eleemosynary institutions, such as St. Luke's Hospital free clinic for the poor, Girls' Orphanage, School for the Deaf and Blind, and Home of the Holy Child. In these the service is purely temporary.

The total in these various institutions now foots up over 75,000 distinct dental operations, performed for nearly 30,000 patients, of whom one-third consists of females and two-thirds of males, while all but about 500 were Filipinos.

Aside from the actual results of the operation of these clinics, it is gratifying for me to note the extension and influence of this propaganda. I am certain that its extension in the schools has been made secure. Recently a large commercial firm, an employer of considerable labor, has made arrangements for dental service for its employees. Several years ago I brought this to the attention of one of our largest tobacco concerns, placing the argument on a basis of sanitation—that is, that it is possibly injurious to have operatives about the weed whose breath is germ-laden. Had I the time, no doubt this matter would be seriously taken up by owners of factories and employers of labor. With the exception of the dental clinic at the Philippine General Hospital for which compensation is included in my service for the university, this work all has to be done without remuneration, and it is too much for anyone to do, hence I am gradually passing on the work to someone who will be paid for it, as is now the case in the public schools.

Recently, the Philippine Constabulary, which is our insular police, also created five positions for dentists; but they have been appointed with too low a grade, that is, only second lieutenant, and difficulty has been found in filling the posts thus created. I think it is contemplated to increase the rank, and of course the pay. The Philippine National Guard also has a dental corps, modeled somewhat after the same corps in the United States army, or rather, as it was a few years ago. It provides for the appointment of one dentist to every 1000 of the enlistment, with the grade of first lieutenant. I have been commissioned a captain in the medical corps, and assigned to organize, instruct, and supervise the dental corps, somewhat like Major Logan in the medical corps of the United States army. These are signs of permanent progress for the dental profession in the Philippines.

We have been made to feel the effects of the war in the increase of the prices of dental goods and supplies, due largely to the decreased shipping facilities on the Pacific. This has unfortunately resulted in a large influx of goods of Japanese manufacture. Efficient as they are in many lines, the Japanese have not improved in the manufacture of dental goods over what they were nearly twenty years ago, when I lived and practiced dentistry in Japan and knew their goods very well. There is too much energy lost in making imitations of and copying outwardly goods of American manufacture, and so far they are expert —but it ends there! Still, for want of American goods we have been compelled to purchase these imitations for some of the clinics on which I have reported in this paper. I have just been informed that the Japanese intend putting two grades of goods on the market—an inferior product, that is to say the present product, and a superior product which is to command a higher price.

We feel assured that the recently opened dental depot of Mr. Louis Xiques, formerly of the S. S. White Company's branch in Buenos Aires, will greatly improve our present most deplorable service.

Some Experiences in the Camps and Fields of the Armies Overseas.

By Major CLEMENT A. PENROSE, U. S. Army Medical Corps.

(Read before the annual meeting of the Maryland State Dental Association, Baltimore, June 5, 1918.)

GENTLEMEN OF THE MARYLAND DENTAL ASSOCIATION:

I AM not a sob speaker; I shall not try to harrow you with German atrocities, undoubted facts as they are, or with the mangled bodies of the dead and wounded, etc.; I feel that my mission is a broader one. I wish to tell you something about our trip abroad, what we saw and what we learned in the British camps and fields—to stimulate you to a deeper sympathy for our own flesh and blood across the seas; to help cement, if only in a small way, the ever-growing feeling of brother for brother, the unity in thought and purpose of the Anglo-Saxon race, allied with our martyred friends, the French people, on whose blood-soaked soil, it seems, the final outcome of this great war must eventually be decided.

I have recently returned from the front, and I want to go on record to the effect that I have returned from England with the greatest love and admiration for the Englishman. I was detailed by the Surgeon-general of the United States to go to England to visit the army camps in England, then to cross over to the army front of the English, and there to study the conditions in the fighting zone. I was then switched to the American forces, and by accident, not by design, I happened to be in a little army camp hospital where the casualties of our American troops were treated. I personally had the experience of treating surgically the first American wounded of this great war.

We left New York harbor, August 23, 1917, on the good ship Baltic, with some two thousand troops, a hundred or more nurses, Red Cross workers, etc., on board. We had the usual lifeboat drills, and lights out at night, about which you have probably heard, and which gave an atmosphere of suppressed excitement throughout the journey. We finally reached a large harbor where we were joined by twelve other good-sized vessels. After being detained here some days we left as a fleet, and all proceeded toward the shores of England. When about three days out we were met in the early morning by a number of little craft, eight torpedo boats (English) and three destroyers (American). I can never forget the beautiful sight these little vessels made in the light of a glorious sunrise, coming over the edge of the horizon like a swarm of hornets, with their business-like riggings and armament. How we welcomed them! knowing that the question now of an efficient convoy through the submarine danger zones was well solved. Ten of our vessels proceeded toward France with eight torpedo boats, while the three White Star liners, the Belgic, the Megantic, and our ship the Baltic, proceeded directly to Liverpool, each convoyed by an American destroyer. In a few hours we had all separated and soon lost sight of one another. All went well with us until about one hundred miles out from the Irish coast. We were at dinner in the first-class dining-room, eating a very excellent dessert, I remember, when suddenly a tremendous crash

was experienced on the port (or left side) of the Baltic, near which my table was placed. The cry arose, "We are hit!" and immediately five blasts of the steamer's whistle were sounded, the signal to assemble at our lifeboat stations on the decks. Some of us organized the exit of the first-class passengers from the dining-room; the nurses behaved splendidly. The men stood aside and waited for the women to go out first. This was done in an orderly, I might say an American manner. We took our places near our respective lifeboats, and these were quickly lowered to the water's edge, and waited patiently, occasionally looking over the side of the vessel to see if we were sinking or careening, as we imagined would soon be evident. In the offing, about one-third of a mile away, those standing on the port decks could see a dense smoke screen beyond which our gallant little destroyer was rapidly moving back and forth. After a half-hour or so the first officer with his crew came around and said, "The danger is past. You are all dismissed." Wondering what had caused the crash, I looked up my good friend the ship's doctor, who told me we had experienced simply the concussion from a depth bomb which our gallant little destroyer had sent down over the submarine, and that he had every reason to believe that the submarine had been destroyed. This belief was confirmed later by the Admiralty reports which we read in London.

We arrived in London during that harvest-moon time in which some of the worst air raids, from the standpoint of mortality, took place, six in succession, and others with an occasional day or two intervening. This is a wonderful experience. A thousand anti-aircraft guns go off at once. The heavens are mapped out like a checker-board, and certain areas in the sky are filled with bursting shrapnel, the effort being to drive some of the planes into these danger zones; very few, however, are destroyed in this manner, the main effect being that the airplanes are kept so high in the air that they cannot make out any important landmarks. Thus far none of the beautiful old historic buildings in London have been damaged. The way the British public accepts these raids is magnificent. It is considered bad form to pay much attention to them. The servants can go home, or into the tubes, if they so desire, but the householders seldom leave, and go about their usual routine without showing any fear.

Unfortunately the mortality has been quite high among the non-combatants, especially women and children. To date, I understand, England has lost probably, through submarines and air raids, more than fourteen thousand people. One day when we were coming up from Folkstone, we were told that, just the day before, a bomb was dropped on a primary school-house in midday and from twenty-five to thirty little children were mangled.

I did not ride in a single automobile in England or in the war zone in France that was not driven by a woman chauffeur. In one case I was riding with an officer in an automobile, and he said the chauffeur of the automobile was his colonel's daughter, enlisted like a man and drawing a private's pay.

In economy, England has made a great advance in her camps, both at home and in the field; in many the garbage is ground up, even the bones, and all fat is extracted by superheated steam; the residue is pressed into cakes for dog-biscuits or hog-food, and occasionally mixed in fodder for cattle. The wash-water from the dishes, etc., is passed into a common gully outside the kitchens and into three tanks of cold water, from which the grease is skimmed which rises to the surface. In 1916, 1200 tons of glycerin was saved by the British armies, which translated into shells equals one million and a quarter 18-pound shells.

I was going through a Portuguese camp in England with a splendid type of British colonel who accompanied us. He noticed under a Y. M. C. A. hut an insignificant pile of note-paper. I thought the old fellow would have a stroke of apoplexy. He called out all the men who

were supposed to be responsible and he gave them the worst tongue-lashing I ever heard. After visiting several other camps that afternoon, he finally turned to me—evidently it had rankled in his mind all day—and said, "Major Penrose, I'm awfully sorry that you saw that pile of note-paper under that Y. M. C. A. hut, but remember it was a Portuguese and not a British camp." This thought gave him some consolation.

I also went through some of the sanitary schools and the Royal Hygienic Institute, where food captured on German prisoners is analyzed. The German soldier is not faring any too well, judging from the rations I saw examined: the odor and appearance were not appetizing.

England has out-Germanized the Germans in scientific investigation, under the incentive of this war. She has encouraged her foremost scientific men to make the most painstaking investigations. Certain discoveries have been made that would almost justify this terrible war but for its horrors. I will here instance two or three of them in order to illustrate this statement.

Since it has been necessary in modern warfare for a man to expose himself, especially the lower extremities, to cold and wet, it has been rather interesting to note that a rather serious condition of the foot has developed, which is called "trench foot." There are three stages of this condition—the simple edematous stage where the foot is cold and swollen, bluish-looking, congested, and tender on manipulation, with a sluggish circulation. Second, there is a blister stage; small blisters appear, often showing purulent fluid and often a hemorrhagic fluid. The third is the gangrenous or necrotic stage. Here we get gangrenous sloughs down to the bone and deeper tissues which frequently necessitate amputation. Then we find a fourth stage, a general riddling of the soft parts, with destruction of the bone. With the last there may be complications which will result in death, although this is rare. Several doctors in the French and English armies have made studies of this disease, and have found that it is not caused by frostbite or chilblains, as it occurs in temperatures that are too warm for such conditions, the temperature being above freezing, and in periods of the greatest humidity. They have found by making investigations of the tissues involved that it is due to the inoculation into the tissues of several kinds of fungus growths. The three principal ones found are: First, *Scopulariopsis Koningii Ondemans*. The second is *Sterigmatocystis versicolor*. The third is *Penicillium glaucum*. These are three of the most prevalent fungus growths. The microscopical pictures observed in these lesions are quite characteristic, and similar lesions can be produced by inoculation from human beings into animal tissues. In the cases with penicillium glaucum it is necessary to previously expose the animal's foot to prolonged immersion in cold water before it will take up the inoculation.

Many remedies have been tried, alkalis and camphor giving the best results. A borated camphor soap, consisting of camphor 25 parts, borax 10 parts, and green soap 1000 parts, is quite commonly used.

They train the non-commissioned officers to take care of the men's feet and to give instructions in this care of the feet. The men put on dry stockings when leaving the trenches, and frequently the feet are rubbed with camphorated oil. Efforts are now made to keep the trenches as dry as possible, and the men are given rubber trench boots —high hip-boots. In the blister stage and in the gangrenous stage they use a camphorated ether—camphor 30 parts, ether 1000 parts. In the septicemic forms they use an injection of from 5 to 15 cc. of camphorated oil, intra-muscularly. Trench foot is similar in many ways to the Madura foot of the Indo-Chinese peninsula, affecting men who work in the rice paddies.

"Trench mouth," or, as it is called, epidemic membranous stomatitis and gingivitis, is an old disease, Vincent's angina, under a new form. It has occurred among men in the trenches in France, and especially those who have taken poor care of their teeth. The be-

lief is that eating hard food has also contributed somewhat to its development. Major F. B. Bowman of the Canadian forces has described this disease accurately and has outlined a very efficient treatment. The clinical symptoms are foul breath, bad taste, enlarged sublingual and submaxillary glands, swollen, spongy, and retracted gums with the characteristic membranous exudate, especially at the margins of the teeth. On rubbing this a bleeding surface is exposed, and the teeth when tapped with a little instrument are tender; so much so that mastication is seriously interfered with. The temperature ranges between normal and 102° F. The disease is especially marked at the junction of the teeth with the gums, and especially about the posterior molars, with numerous lateral spreading superficial ulcerations. These are noted over the sides of the cheeks; over the tonsils there is a tendency to burrow deeply.

The disease is communicable, occurring in groups of men using the same utensils or attended by the same dentist. Under the microscope a little of the exudate when rubbed up with a salt solution will show the presence of spirochetes in large bundles, and also a characteristic fusiform bacillus, both forms being motile and very slender, delicate organisms with five to twelve convolutions. The identity of this condition with Vincent's disease is therefore proved. One of the chief symptoms is great mental depression with malnutrition due to the men's being unable to eat. The prevention is to correct the dental trouble and make them, first of all, attend to the hygiene of their teeth and mouths.

The treatment that is most efficacious is arsenic. The following is a formula that Bowman uses: Wine of ipecac one-half ounce, glycerin one dram, with Fowler's solution one ounce. This is to be mixed and used as a mouthwash and applied with an applicator directly to the affected gums. A saturated solution of tartar emetic can be used in the above formula in the place of Fowler's solution. Recently they have found that the wine of ipecac is unnecessary, and the Fowler's solution or tartar emetic can be used alone. Good results are obtained in the use of this treatment, even in severe cases.

Within a week most patients are practically well and able to masticate solid food. Formerly it took from three to four weeks to put men in shape to go into service. In the Royal Hygienic Hospital they have discovered a cure for beri-beri—simply the use of brewer's yeast, and a cure for scurvy by the use of sprouting beans. A man can take a certain quantity of beans and soak them twelve hours in water and then let them germinate for forty-eight hours between two sheets or blankets. As soon as the bean has sprouted it produces in itself a remedy both for the cure and prevention of scurvy. The chances are that pellagra and rickets and other diseases of a similar nature due to certain deficits in food can all be treated somewhat along similar lines.

The elements in the food which prevent these diseases are called vitamines. In scurvy it is an interesting thing to note that it is cured by fresh meat and vegetables, but the fresh meat must possess certain vegetable elements, *i.e.* it must come from vegetable-eating animals.

I cannot close an address of this kind without reference to the good work of the Y. M. C. A. and other similar societies. These bring into this war some very essential things, more important today than ever before. The average young man who enters the army now differs very materially from the old-time regular soldier. I know, having been reared as a boy in the old army; my father was a regular army officer. The soldier today is high-strung, like a racehorse; often better educated than his officers, he has been accustomed to diversion and home refinements which are greatly missed in the monotony of camp and field life. The Y. M. C. A., etc., with their simple little amusements and recreations, their refined men and women, bring into the life of the young soldier many things which he sadly misses. A poor young Western boy suffering from homesickness crept into a Y. M. C. A. hut in France. He sidled

along the wall and sat down, by himself, in the back part of the building. An attractive young Y. M. C. A. worker approached him and said, "Is there anything I can do for you?" to which he replied, "Gosh, lady, just sit down and let me look at you." We have all felt like that boy, at times, in France, and can sympathize with his feelings. In this war for the reasons cited above, cordial relations between officers and men are most necessary, the old-time martinet as well as the officious yet inefficient young officer, will gradually drop out. As an English colonel tersely put it, "By Jove, you had better get along with your men, or they will get you from behind going over the top." Even if this did not occur there are times when the men by a little extra effort could save their officer's life, and if he is unpopular this effort is not made.

I treated an American soldier who came from St. James, Mo. His left eye was blown out and his left elbow was crushed by a shell. I remembered that I had treated the people after whom this city was named. The boy brightened up and he was made very happy when I mentioned some old familiar names. It is a great comfort to these boys to hear something about their home people. The case to which I have referred was especially pathetic.

Our American boys stood their wounds just as well as any other soldiers that I had seen in France.

Possibly because I was raised in the army as a boy, my interest in military matters was stimulated. I had written articles on such subjects and also delivered an address before the Baltimore Medical Association five months before England and Germany went to war. This address was practically a prediction of this war. The *New York Times* after the war was declared published this article in full (October 4, 1914), and also the *Army and Navy Journal* wrote an editorial on it. In this article I emphasized certain conditions.

Although we were spending, I stated, more money on philanthropy than any other country in the world, we were unfortunately showing a greater percentage of murders, suicides, and imbeciles in our population. Thirty per cent. of our defectives were of foreign birth. There were too many people in our midst who were adopting a number of erroneous philosophies and cults in the spirit of self-justification. Some mothers, tired of sitting up with sick children, adopted a mental cult which enabled them to sleep at night and let the babies yell. The anarchist, born with the lack of desire to work, became a morose and unhappy individual until anarchy was given him as a panacea. The pacifist, not liking to fight, took up pacifism. He would fight hard enough if one tackled his pocket-book or usurped any personal prerogative.

We were gradually establishing a number of peculiar cults and rattlebrain philosophies. Germany, on the other hand, was formulating but one fell philosophy, that "Might makes right," together with a gradually growing efficiency. What could be the outcome? War was inevitable sooner or later.

We have sent our youth to this war, and the youth of a country is the best part of any country, because the ideas of youth are living and potential, while as we get older our ideas are more or less dead and dying; we are hampered by our traditions, by experience, and we count the cost. Our boys over there do not count the cost. What would you think of a soldier who did count the cost? He would not be a soldier at all.

It was absolutely necessary for every man, woman, and child in this country to get back of the fighting men in the same spirit that England has gotten back of her fighting men and not count the cost either. The thing that worried me at first was the uncomfortable feeling that perhaps we might fall short in this.

When we come to realize that the atrocities are absolutely true, that these barbarians are indulging in an inhuman warfare and our boys will suffer at their hands, we will fully awaken. The British soldier will never forget certain events which have happened, and every soldier in the Allied armies is surely developing many bitter memories.

Conduction Anesthesia.

By J. N. C. MOFFAT, D.D.S., Shelby, Miss.

(Read before the Mississippi Dental Association, Meridian, April 16–17, 1918.)

LOCAL anesthesia in its various forms successfully employed is the greatest practice-builder at our command, as it enables a dentist to do thorough work with a minimum amount of pain. The public knows that this is being done by ethical practitioners, and is beginning to demand it more and more.

The remark is often made that nerve-blocking is difficult and complicated. It is, if a man thinks he can employ the same careless technique that is usually employed when an injection is made into the peridental membrane for a simple extraction. It is not, if the proper technique is carried out.

If we know the nerve supply to the different teeth and surrounding tissues, and are familiar with the anatomical guides that will enable us to inject a sterile solution around these nerve trunks, then all we need is practice. Of course, I do not mean that a man can start into this work and get gratifying results without some preparation, but I do mean that any dentist of ability along other lines, who will apply himself and will observe carefully the smallest details of asepsis, can and will get gratifying results.

It is my desire to make this paper absolutely practical, and for that reason I shall not discuss the various technical methods of producing anesthesia, nor any phase of the subject except those which are concerned in our everyday use of local anesthesia. This paper therefore is intended for four classes of men:

First: Those who use nerve-blocking frequently with success.

Second: Those who have used nerve-blocking frequently without success.

Third: Those who have learned something about the technique but for some reason have not tried it.

Fourth: Those who are not familiar with the technique.

The first practical discussion of nerve-blocking I ever heard was at our meeting in Jackson, by Dr. S. L. Silverman of Atlanta. He made it appear so easy and practical that I was extremely interested, and asked him this question at the close of the lecture: "Is there a textbook on the market that will enable a man that is unfamiliar with this work to get sufficient practical information to enable him to do nerve-blocking successfully?" He said "Yes," and recommended Fischer's book. I bought one of Fischer's books, read just enough to know that I did not know anything, and laid it aside. I did not attempt nerve-blocking until two years later. I have since learned that if a man will get Fischer's book on local anesthesia and study it carefully, and will get just a little practical demonstration from someone, he can do nerve-blocking.

INSTRUMENTARIUM.

Now let us take up the practical aspect. The first thing to do is to get a suitable equipment. It is not necessary to buy everything the experts say, but if you are going to economize on the essential parts of the equipment you had better let conduction anesthesia alone. The next thing needed is a place to keep that

equipment. If it is stored away in a cabinet drawer it will be necessary to boil everything each time you use it. Purchase a sterilizing jar made for the purpose and fill it with 70 per cent. alcohol. The other essential parts of the equipment consist of a suitable hypodermic syringe without washers that will hold at least 3 cc. of solution; a short needle 15 mm. in length; a straight needle 30 mm. in length; a 30 mm. needle with curved shank for tuberosity injections; a 3 cc. novocain dissolver, and a 10 cc. dissolver. It is best to use iridio-platinum needles, because they will not corrode and can be heated to a cherry red as often as desired.

It is also desirable to have a study skull. I do not believe a man can make a success of nerve-blocking unless he has a skull to use in his study when he begins. I suspect there are men present who have made failures in their injections who would have been successful if they had had a skull to freshen the memory in regard to the anatomy of the region before making those injections.

The E tablet will meet all requirements, so we will not discuss the different tablets, which vary in suprarenin content. Only distilled water and Ringer's tablets should be used for making the solution to which the E tablet is to be added. I use a Silverman still and distil my water fresh every day and usually immediately before making solutions.

PREPARATION OF THE SOLUTION.

Let us now describe the preparation of the solution. I first remove the 10 cc. dissolver from the sterilizing jar, fill with freshly distilled water, boil thoroughly, and then empty it. This is done to remove all traces of alcohol, and, as an additional safeguard against infection, before placing the distilled water with which I am to make the Ringer solution in the dissolver. We then place a little more than 10 cc. of distilled water in the dissolver, and boil. If freshly distilled water is used, it is not necessary to boil for any length of time. One Ringer tablet is placed in the 10 cc. of distilled water, which gives a physiologic salt solution. We then pour 3 cc. of this solution in the 3 cc. dissolver, which has been previously prepared for it by boiling distilled water in it, just as with the 10 cc. dissolver, before making the Ringer solution. We now add 3 E tablets, or 1 E tablet to each cc. of solution, which gives a 2 per cent. solution, the strength usually employed in making the injection.

Select the needle indicated, adapt it to the syringe, and wash the syringe out several times to clean it of alcohol by drawing in and expelling sterile distilled water several times. The needle is then heated to a cherry red and the syringe filled with anesthetic solution ready for the injection. We now have a 2 per cent. sterile solution that is isotonic.

METHOD OF MAKING INJECTION.

We are now ready to prepare the field for the injection. We must always remember that we are going to inject this solution into the deep tissues. Spray the mouth thoroughly with some antiseptic used in routine work; dry the point well where the needle is to be inserted, and wipe the tissue with tincture of iodin. The needle should always be heated to a cherry red before making the injection and before drawing the solution into the syringe. The solution should be as near the temperature of the body as is practicable. I test it by dropping a few drops on my forearm. If I cannot feel the temperature of the solution, it is a fairly safe guide that the temperature is approximately correct.

I may say just here that there are two points that will prove of invaluable assistance if one will carry them out in every instance. These two points were deeply impressed upon me by Dr. Silverman: If in making an ordinary injection the patient should show any unfavorable symptoms, the first step would be to place him in a reclining position; so why not do this before making the initial puncture? The other point is, to

avoid making the injection too rapidly. Dr. Silverman says that sixty seconds by the watch should be the minimum time required for making the injection. When I make an injection, my assistant stands behind the chair with a watch in hand, and my minimum time is nearer two minutes than sixty seconds in most cases. You should be careful to distribute the solution equally for the entire time. If you consume sixty seconds in injecting one-half of the solution and then inject the other half at once, you have destroyed the effect of the slow injection.

There is another important point. When a patient presents himself for an operation with a well-defined area of infection, we should not attempt a nerve-blocking injection if it is necessary to pass the needle through the infected area to reach the point necessary for anesthesia. Do one of three things: Hurt the patient as much as is necessary, administer a general anesthetic, or do not attempt to operate.

I shall now hurriedly describe the fields covered by the various injections. In the upper jaw the tuberosity injection will produce anesthesia of the second and third molars, and in some instances the first molar. We cannot rely upon anesthesia of the first molar in a tuberosity injection, on account of the distribution of the middle superior dental branches. Infiltration anesthesia should be employed for the two bicuspids and the first molar when necessary.

If a nerve-blocking injection instead of infiltration is made for the six anterior teeth, it should be made at the infraorbital foramen, but remembering that the success of this injection depends upon the solution getting back into the infraorbital canal. If infraorbital injection is used for only one side, infiltration must be employed at the median line if an operation is to be performed on a central incisor, to block off sensation from the nerves anastomosing from the other side. If the lingual surface is involved in an operation on the upper jaw, a lingual injection is necessary to block off the naso-palatine or anterior palatine branches. In the lower jaw, infiltration may be employed for the six anterior teeth, but the mandibular and mental injection should be used for the posterior teeth. The lingual nerve is blocked in making the mandibular injection, which produces anesthesia practically to the median line, where it meets the injection from the opposite side. If anterior teeth only are to be removed, the lingual nerve may be blocked at any point along the lingual surface.

I realize that one cannot do nerve-blocking successfully simply from listening to what I have said, but I believe I have suggested some points which may be of some assistance to each of the four classes for which this paper was intended.

CORRESPONDENCE

"Sulfuric Acid in Root-canals."

To the Editor of the Dental Cosmos:

Sir,—As Dr. S. J. Kessler has brought forward the question of the respective self-limiting action of sulfuric acid and of the sodium and potassium alloy in your October issue, I avail myself of the privilege of replying to his communication through the same channel.

In this instance, as is often unfortunately the case, a sentence lifted from a paragraph loses the identity, and in particular the significance, it possessed in the original text. In my article in the June issue of the Dental Cosmos I spoke of the fact that we should use only sodium and potassium as we approach the apical end of the canal, and that we should use it only in almost microscopic amounts. Then the sentence immediately preceding the one quoted by Dr. Kessler reads, "On this account we may safely go *through* the apical opening." This would of course indicate that I was speaking of the relative action of the two agents upon the immediately surrounding periapical tissues, and these are *soft tissues.*

The point at issue is then further clouded by creating the impression that I am at variance with Dr. Callahan, by quoting from him to the effect that sulfuric acid is self-limiting in cancellous tissue, and that sodium and potassium is not. Here lies the *apparent* difference. Dr. Callahan spoke of cancellous tissue, by which he meant hard tissue, and I spoke of periapical tissue, by which I meant soft tissue.

Anyone with a knowledge of chemistry would know that the action of H_2SO_4 would be limited in action in bony tissue, because the acid radical would be quickly satisfied by combining with the high calcium content of cancellous structure. In fact, in looking over Dr. Callahan's original paper (*Items of Interest,* August 1915) I find that Dr. Prinz in his discussion went into detail on that point. There is a percentage of cases where the canal contents have completely dried out in which the application of Na-K, without the proper previous application of water, will result in a very gradual saponification of these contents and of the canal walls. In these cases the action is not, strictly speaking, so limited, and this was probably the case with the specimen Dr. Callahan presented. But with the proper technique this is not the case. However, in dentin the inorganic content is about 75 per cent. of the mass, and I spoke then only of its limited action on all organic matter. The action of Na-K is, as has been repeatedly pointed out by Dr. M. L. Rhein, largely due to its affinity for water, and all soft tissue has a high water content. This is the reason why we can so readily open canals and with the roentgenogram find in so many cases that accessory canals, often even at right angles to the main canal, have been cleaned of their contents and we are thus enabled to properly fill them. Na-K, in the extremely small amounts in which we should use it, when it touches any soft tissue instantly enters into chemical combination with it, and both lose their original identity, leaving in this case only such a trace of sodium and potassium hydroxid that its action is negligible.

Sulfuric acid, on the other hand, acts on soft tissue as a caustic or by virtue of its ability to coagulate albumin.

Its action on such tissue will continue uninterruptedly until its acid radical is entirely satisfied, and in soft tissue the inorganic salts are so small a percentage of the mass that they have no appreciable effect in limiting the caustic action. Therefore the action of sulfuric acid cannot be viewed as a self-limiting one in soft tissues.

We must consider not only the chemical reactions of these two agents, but also their physical characteristics. Na-K is an alloy of plastic consistence, so that we may pick up any amount at will and place it in the canal with the assurance that it will not pass through an opened apical foramen. Sulfuric acid is a liquid, and we can only apply it by placing a drop in the canal, and if the apical foramen be opened it can be and often is drawn through, coming in contact with the periapical soft tissues. Therefore if one feels that he must still use an agent so dangerous to soft tissues, when working in the apical third of root-canals, he should assuredly resort to the use of the paste form in which sulfuric acid has been recently introduced.

In order to test these reactions on living tissues, a guinea-pig was used. Making an incision through the skin, it was dissected back a short distance, exposing healthy muscular tissue. On the one thigh so prepared was placed some sodium and potassium, much more than would ever be protruded accidentally through an apical foramen, and on the other so prepared was placed one drop of 50 per cent. sulfuric acid. The Na-K reaction was entirely confined to the point of application, while on the acid side the reaction was spread over quite an area, and was much more violent in appearance. This rather empirical experiment goes to prove the above explanation as to the respective actions of the two agents. These experiments, to be conclusive, should of course be carried out by working the agents through the root-canals of dogs' teeth, sections being made of the tissues, but I have not at present the necessary time to carry out such a long series of experiments, and I write this in order to demonstrate more clearly to any other investigator who may be interested enough to carry the work farther, this difference between hard and soft tissue when acted upon by these agents.

In conclusion I wish to thank Dr. Kessler for his interest in the matter.

Very cordially yours,

MILTON J. WAAS.

CAMDEN, N. J., November 11, 1918.

"Self-limiting Action of Sulfuric Acid."

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—Concerning the action of sulfuric acid on teeth, the late Dr. Geo. Watt, many years ago professor of chemistry in the Ohio Medical College, and in the Ohio College of Dental Surgery, this city, affirmed before a class that this acid was self-limiting.

Dr. Callahan, who is referred to in Dr. Samuel J. Kessler's contribution to the Correspondence column in the DENTAL COSMOS for October, once asked the writer if he knew whether or not this acid was self-limiting. I referred him to Watt's "Chemical Essays," saying I thought Dr. Watt therein affirmed what he had stated before our class.

Dr. Watt spent many years elucidating his theory of acid decay of the teeth, affirming that sulfuric acid caused the black variety of decay, accounting for the slow progress of this (alleged) form of caries on the hypothesis that a minute portion of the nascent acid attacked a tooth, the action ceasing almost instantly. Again, conditions favoring its

production, another similar action would follow. Emphasis is to be laid, of course, on the affirmation (as to the acid being self-limiting).

Although candor requires that a former editor of the Cosmos once declared that Dr. Watt saw some things in the microscope which "wer'n't there," the credibility of his express testimony on this point need not be thereby invalidated.

Respectfully yours,

Frank W. Sage, D.D.S.

Cincinnati, O., October 11, 1918.

"Professional Capability and Dental Commissions."

To the Editor of the Dental Cosmos:

Sir,—In your October issue, Dr. R. A. Clark has written a letter entitled "Professional Capability and Dental Commissions." I think some things that he has written should be cleared up. For instance, he has said that he has in mind at the present time three young men, experienced not only in every branch of dentistry but also in anesthesia, surgery, and medicine, who are or will be drafted as plain privates, while inexperienced, newly graduated men are wearing the officer's uniform. I suppose that it is unjust (?) that the above three men did not have the patriotic spirit to volunteer for commissions, when commissions were to be had, instead of waiting to be drafted.

Dr. Clark also does not know that these "inexperienced, inefficient 1918 graduates" can put many of the older practitioners to shame, on account of their receiving special courses in war surgery and fracture work. The main idea in Dr. Clark's mind is that recently graduated men are not so good as those who have been in practice for years; but experience is not the main thing.

However, the whole question of commissions is remedied now, in that the United States Government has increased the *personnel* of the Dental Surgeons Corps, and Dr. Clark, his three friends, and older experienced men, as well as the "inefficient" 1918 graduates can (if ability counts for anything) get commissions.

Very truly yours,

Benj. Daniels, D.M.D.

Dorchester, Mass.

PROCEEDINGS OF SOCIETIES

Maryland State Dental Association.

Annual Meeting, held at Baltimore, Md., June 6-7, 1918.

THE annual meeting of the Maryland State Dental Association was held in Odd Fellows' Temple, Baltimore, Md., June 5, 6, and 7, 1918.

WEDNESDAY—*Evening Session.*

Dr. Eldridge Baskin, Baltimore, president, called the convention to order at 8 P.M. Wednesday, June 5th.

Rev. J. M. GILLUM of Baltimore opened the meeting with prayer.

As the first item on the program of the evening session Dr. Baskin introduced to the audience Major CLEMENT A. PENROSE, Baltimore, of the medical corps of the U. S. army, who gave an address entitled "Some Experiences in the Camps and Fields of the Armies Overseas."

[This address is printed in full at page 1119 of the present issue of the DENTAL COSMOS.]

DISCUSSION.

Dr. B. Merrill Hopkinson, Baltimore. I want to ask Major Penrose in connection with "trench mouth," if the treatment was entirely local, and was confined to Fowler's solution?

Major Penrose. The dental treatment was practically local, and it is surprising how these cases cleared up. There were splendid results secured in a few weeks' time; formerly it took anywhere from four to seven weeks. The effect of Fowler's solution in those cases is remarkable.

Dr. H. E. Kelsey, Baltimore. Did I understand Major Penrose to say that they could not mill wheat on the other side, or that they could mill only wheat?

Major Penrose. They cannot mill any of the other cereals on the other side. The rollers are made only for wheat.

The society then adjourned until Thursday morning.

THURSDAY—*Morning Session.*

President Baskin called the convention to order at ten o'clock.

The PRESIDENT. Gentlemen, I am very glad to present to you Dr. NORMAN S. ESSIG of Philadelphia, who will now deliver a paper on "The Needs of Prosthetic Dentistry."

[This paper is printed in full at page 1108 of the present issue of the DENTAL COSMOS.]

DISCUSSION.

Dr. H. E. Kelsey, Baltimore. There are some ideas in the paper that are new to me, and I would like to say that I hope Dr. Essig's investigations will be studied with a great deal of interest by the orthodontists, as he has most clearly presented his ideas. There is much in the paper that will be of the greatest value to those who are dealing with nat-

ural teeth as well as those who are dealing with artificial teeth.

Dr. B. Holly Smith, Baltimore. I think Dr. Essig is wrong in his terminology. He applies the word robust to the cuspid tooth. I think he ought to use another term. He might say the militaristic cuspid tooth. I would be satisfied to describe the cuspid in that way.

I was much interested in Dr. Essig's essay. In the classification of teeth it has always seemed to me that the third molar is the only one where we must make apologies for its lack of space. The lateral incisor is designed by nature to give a softened or feminine expression to the face, and may be forced by other more essential teeth into an inferior position for its development. It seems to me that in the case of the third molar, as a result of the usurpation of the molar and its position down in the angle of the jaw, we might apologize for its distortions by lack of space; but does the lack of space influence the shape of those other teeth?

Dr. Essig. I rather think it does. There is a time in the developmental stage of any tooth when it is more or less pliable. I was not making an excuse for the lateral; I was simply commenting on it. I am perfectly willing to let it remain in its original condition without any faultfinding in the least, but it seems to me in the developmental stage it cannot be done. You cannot raise a husky or warlike lateral. In other words you cannot make a major-general lateral out of one that is only a corporal in size. It seems to me that any tooth under normal conditions takes the space allotted to it. The third molar has often more time. I think it is just a tooth with a bad disposition. It is not that it has no room to come through, but it just takes a notion to turn upside down; but the lateral tooth is not, to my mind, as unruly a member as the "wisdom" tooth. We see it in small children with the permanent teeth in their developmental process before the roots have thoroughly formed. We find the whole capsule is so soft that it could very readily be distorted. I think if there were more room for the lateral there, it would not be so long and narrow; it becomes a long, narrow tooth. If the space is sufficient the teeth are not deformed. You often see queer teeth with ample space between them and other teeth of the same size. I am speaking of the form in the firm, well-developed mouth where there is ample room. I do not say that that always takes place, but especially in teeth of large size going into small arches without being unduly crowded. It seems one way in which nature takes care of affairs, and it becomes ideal. In the models I showed on the screen, with the dissimilar laterals, especially those of the hooked shape or banana shape, those mouths were all comparatively regular, with very large teeth in small arches.

Dr. B. Holly Smith. I fear that I had the appearance of a little rudeness in my reference to the term "robust." I appreciate very highly Dr. Essig's paper. I think he has accomplished something that he may well be congratulated upon. In this day and generation things modern have sometimes swept us away, and every man of us here likes to at least try to put his faith on a right and a sure foundation. Dr. Essig's heredity places him on a firm foundation. He was born and bred and raised right along that line; he has lived that life, and the life of what we used to call a mechanical dentist.

What do you commend, doctor, as the best base for plates? It seems to me that for the great majority of purposes it should be vulcanite, or a combination of gold and vulcanized rubber. I believe some of the most satisfactory plates or dentures I ever made as far as adhesion is concerned have been rubber; yet I can call to mind other plates which also were satisfactory in their adhesion.

Dr. Essig. I think in the majority of cases rubber is most satisfactory. One case I have just made was one in which the patient had had six dentures made in rapid succession, and could not retain any one of them in the mouth or use them in the slightest degree. I do not know the man who made the dentures,

but the dentist had finally given up, saying, "I cannot do it; you have a queer mouth; I do not know what to do." I was a little nervous, as I thought that I had come across one of those "hoodoo" mouths, where for some unaccountable reason there was some insuperable difficulty, but it was one of those cases where you feel that you want to do your best, and I undertook it. I took the impression with the Hall method. When finished the patient could not get the plate out without the use of a glass of water. I could not get it out, and he said he had to fill his mouth with water and drive the water under the plate to dislodge it. There is always much to say in favor of the gold plate, but in many instances a patient cannot afford one. I do not believe that so far we have anything that has superseded either gold or rubber as a base for artificial dentures.

The PRESIDENT. Next on the program is an essay by Dr. A. H. PATERSON of Baltimore, entitled "Careful Technique the Greatest Factor in the Construction of Full Upper and Lower Dentures."

[This paper was printed in full at page 876 of the October issue of the DENTAL COSMOS.]

The meeting then adjourned until the evening session.

THURSDAY—*Evening Session.*

The President called the meeting to order at eight o'clock.

The PRESIDENT. We have with us this evening Dr. L. ASHLEY FAUGHT of Philadelphia, who will read a paper on "The Conservation of Approximal Interspaces, Together with the Adjustment of Occlusal Relationships."

[This paper was printed in full at page 976 of the November issue of the DENTAL COSMOS.]

DISCUSSION.

Dr. B. Merrill Hopkinson, Baltimore. I want to ask a question. Do I understand you to say, Dr. Faught, that all cavities should be cut down below the gum line?

Dr. Faught. That is the idea.

Dr. Hopkinson. I am sure everything that the doctor has said is good.

Dr. Arthur B. Crane, Washington. There is nothing that I can say except in commendation of what has been said by Dr. Faught. Everything the essayist has said agrees with my own opinion, and I wish to congratulate the audience on having had the opportunity to have these things pointed out, and placed before us so forcibly.

Dr. C. C. Harris, Baltimore. It is very gratifying to hear something along the line of operative dentistry, and I would like, if I had a good memory, to say a great deal on many of the points that have been touched upon. Looking after articulation or occlusion is certainly an important part of every dentist's work, and applies to every patient who is from thirty to forty years of age. Wear on the teeth forms inclined planes which force the teeth from their normal position, causing interdental spaces that are never kept clean, and results in all the ravages of decay and pyorrhea. A great deal of pyorrhea is brought about from teeth losing their normal occlusion, thus causing pressure irritation to the alveolus not intended by nature. It is certainly very important that the interdental spaces should be well cared for, with fillings so constructed as to prevent the forcing of food into the spaces. I certainly must take issue on the point of cutting all the approximal cavities down to the gum margin, when so many cavities can be saved with small fillings through many years—possibly ten to fifteen—and if we can gain that much with the small filling it is so much added to the life of that tooth. We may be forced to come to large fillings later, but let us delay them as long as possible. It seems to me that it is our duty to do this, it matters not how many fillings we must insert during a patient's lifetime. It is our duty to preserve every small quantity of structure, even though several fillings be required to preserve

a tooth for its longest usefulness. I do know that teeth are wonderfully preserved with non-cohesive gold, and far better than with any other material or method. I do not think our so-called up-to-date materials are in the non-cohesive gold class at all as to tooth preservation. It is superior, and does away with the extreme cutting that is so frequently found. These fillings can be inserted in such a manner that only the patient and the operator need know anything about them. I have some such in my mouth, and have had them for forty years, which do great credit to the operator.

Dr. W. W. Dunbracco, Baltimore. Mr. President, I want to thank Dr. Faught for his paper. I recall his first essay before our society; I remember him when I first came into this association, and have always identified him with the early years of this organization.

Speaking of non-cohesive gold as the filling material at the cervical border, the difficulty is in getting the right contact point. He says it should be below the gingival border. I want to ask him if he makes his fillings which go into the approximal surfaces entirely of non-cohesive gold, or if he does not use it for a certain distance up or down, and if he *does* use non-cohesive gold throughout, can he retain that contact point? That is the trouble that most of us seem to have—getting that contact point.

Dr. Faught (closing the discussion). Mr. President, I think I have but very little more to say, and do not wish to detain you any longer, but inasmuch as Dr. Dunbracco has asked a question, it seems to me proper that I should answer it. He refers very correctly to the difficulty of making the contact point when non-cohesive gold is used entirely. In practice I use it to a certain distance, and then finish in the usual way with the adhesive foils; it is only in that way that we can get the hard contour.

I was pleased with the remarks Dr. Harris made. He called attention to a thought which was in my mind. It is a fact that as we all grow older, and our tissues grow older, there is a certain amount of wear which produces conditions where the tooth assumes an approximal relationship which is not normal, but which is decidedly abnormal, and which causes a great many of these difficulties we find in patients advanced in years. That is very true, and it is one of the things which demands from us the most watchful care in our treatment of these tissues.

There are one or two other gentlemen here, Dr. Hopkinson among others, who expressed the thought of extending the cavity below the cervical border. When I prepare a paper for a body of this kind, to be read upon an occasion like this, and it subsequently finds its way into the current literature, I am very careful, with these thoughts in mind, not to say anything extreme in my paper, simply because one does not care to open oneself to attack when possibly not present, and to which no answer can afterward be made. The criticism is very well taken. It reminds me, however, of a conversation which I had with several gentlemen in Philadelphia in which we were discussing this very question—the extension of the cavity for preservation of the tooth tissue. Not only in the matter of the cervical relationship, but more particularly with the thought in mind that we should bring the line of juncture between the filling material and the tooth tissue from a point where decay is liable to a point in the tooth where decay is less liable. This relationship approximately often brings that line of juncture into view; in other words, we mar the beauty of the tooth by so doing, even though it be good practice, and it is orthodox teaching. One Philadelphia practitioner said, "Gentlemen, that is all well, but we do not do it. And what is more, our patients do not want us to do it." There is a good deal of truth in what he said. The idea of extension is good sound practice, but we do not all do it, and many times when we feel called upon to do it, in the lateral relationship we decidedly do not do it, and the patients do not want us to do it. So you must read into the paper that which I did not wish to include, and the point

to which Dr. Harris has called attention. We may put in one, two, or three successive operations if need be, in order that the gum tissue may rest against the tooth tissue for so many years longer. Just as soon as we bring the filling material down in this relation it produces a pathological state; it is abnormal, and from that fact this filling material must produce more or less trouble.

I think I have clearly stated all these things now, and as I have nothing further to say except to thank you one and all for the very courteous reception and very courteous discussion of the paper, I will take no more of your time.

The PRESIDENT. We have with us tonight Dr. EMERSON R. SAUSSER of Philadelphia, who will read a paper on "Root Resection."

[This paper will be published in full in an early issue of the DENTAL COSMOS.]

The PRESIDENT. Dr. Homer C. Brown of Columbus is unable to be present with us this evening. He has just telegraphed us requesting that a resolution be sent to Congressman Talbot, Washington, expressing our appreciation and commendation to the Senate for passing the dental bill. What is the will of the body with regard to this telegram from Dr. Brown?

Dr. KELSEY. I think it would be well to pass such a resolution, and send it to Washington as Dr. Brown suggests, and I make that as a motion.

The motion was seconded by Dr. Hopkinson and unanimously carried.

The President, in accordance with the motion, ordered a resolution prepared, and the convention adjourned until Friday morning at ten o'clock.

FRIDAY—*Morning Session.*

President Baskin called the convention to order, and introduced Dr. J. V. CONZETT of Dubuque, Iowa, who delivered a lecture on "Operative Dentistry."

The PRESIDENT. Next in order is a paper by Dr. ARTHUR B. CRANE of Washington, entitled "When Shall Root-canals be Filled, and How?

[This paper is printed in full at page 1093 of the present issue of the DENTAL COSMOS.]

DISCUSSION.

Dr. Emerson R. Sausser, Philadelphia, Pa. I had the privilege last night of reading Dr. Crane's paper, and I enjoyed it and derived much benefit from it. He is always convincing, and his paper shows study and thought, with the result that he gives us something original and practical to help us forget our difficulties. With regard to the attitude of the physician toward the dentist, it is very natural that the medical man wants to be thoroughly convinced that the dentist has eliminated the condition of infection existing at the apical region of the tooth, which is causing his patient systemic infection, and in the absence of scientific proof that dentistry is eliminating these areas, he will very naturally take the matter into his own hands, and suggest extraction of the diseased organ.

The essayist has made a scientific effort toward proving the practical value of his medicinal treatments in cases of periapical infections, by making a bacteriological determination of the tissues before filling the roots. He has thoroughly checked up the conditions on his culture media, yet it is questionable whether he can determine conclusively the bacteriological contents of periapical origin via the root-canal.

The area of infection may lurk below the apex, down toward the body of the root, and not be reached by his method. No doubt it is in the essayist's mind to add to his technique by means of reaching this through the alveolar plate; at any rate, such scientific deduction as his method allows should be of great practical value during the course of treatment.

A clinical investigation such as Dr. Crane is making is just as important and essential to the investigations of the research laboratory as the latter is to the former; by checking up the findings of each, scientific progress is made. As to

future bridge work, the application of the pin inlay as an anchorage to conserve the dental pulp and the tooth structure should receive more universal attention.

Dr. J. V. Conzett, Dubuque, Ia. I wish to express my appreciation of Dr. Crane's paper. He has long since demonstrated the fact that he is one of the very best authorities in the United States on the subject of root-canal treatments. He has given another proof, by the splendid paper which he has read this morning, of his ability along those lines. There are several points in his article which are absolutely new to me, and I want to commend them highly, particularly that part which has reference to apical abscess, filling-in of the apex with gutta-percha by the simple method of pressing down on the tooth after filling the canal. That seems to me a very important point. There is just one other thought. Such papers as Dr. Crane has given us make it our duty to do the work Dr. Crane has done as he has presented it here. A great many dentists will say that they cannot do it, that they have not the ability; they become discouraged, and go back to extraction.

By a study of my radiographic results I find it is not necessary to fill all root-canals absolutely to the end of the canal to obtain satisfactory results. In our histological studies we learn that where the pulp passes through the end of the root the canal is lined with cementum, so there can be no odontoblasts in that portion of the pulp. If there were, we would have a lining of dentin in that portion of the canal. It is a well-known fact that in certain cases there is a sealing over of the end of the root by the cementum under certain conditions. If we force the root-canal filling to the end up through the canal we prevent the physiological condition of the sealing of the apex. If we had no infection, or prevented infection by any organism; if we use no irritant that would prevent the physiological functioning of cementoblasts, we get a sealing over of cement, and in many instances the root-canals will seal over and give perfect results throughout the life of the individual. This thought has given me a great deal of comfort, and I believe that it will be of comfort to others. The prime object is that we must take aseptic precautions in filling a root-canal, and not allow any contamination of that root-canal whatever. If these precautions are observed in the filling of a root-canal it will not be necessary to go beyond and over the apex to get results. I do not mean to criticize Dr. Crane for a minute, for I might not be able to fill every root-canal as he does. But I do say that every man cannot do the work Dr. Crane does, and even though you cannot fill to the very end of the root-canal, if you fill it aseptically you may feel sure that you are taking good care of the people who come to you.

Dr. B. L. Taylor, Washington. Dr. Crane's paper omitted a matter of importance in regard to surgical rest when undergoing treatment. I think that is a point that is overlooked entirely by the dental profession. When a surgeon operates on a patient, if it is an important operation, that patient is given a rest after the operation takes place. We dentists treat teeth every day, leaving them to perform the same functions as when they were perfectly sound. I made a suggestion in a meeting some time ago that where the pulp has been removed the tooth should be ground off sufficiently to allow that tooth surgical rest from pressure during mastication.

With regard to Dr. Crane's paper, I want to say that we are all proud of him in Washington. We know that whatever he does is not done in a haphazard manner. I have seen many cases treated by him where he made all sorts of specimens to check up his work, and it is only those of us who have been associated with him that know the immense amount of time he has put on this subject. We know that what he does is scientifically correct, so far as scientists are able to carry out these theories at the present time.

Dr. Crane (closing the discussion). It is always a pleasure to read a paper in Baltimore, because it is received so

kindly. Dr. Sausser, I think, misunderstands me on bridge work. Very few of the abutments he mentioned are adaptable for removable bridge work. In the paper I said that devitalization would continue until some more efficient method is presented for removable bridge abutments. I think Dr. Tinker and Dr. LeGro are working along these lines, and am sure that before very long much devitalization is going to be eliminated by improvements in attachments for vital teeth. I personally deplore the necessity for devitalization; not that I feel that it cannot be done in a successful manner, in some cases, but there are so many chances for rendering a healthy tooth an unhealthy one. Dr. Conzett's caution about not filling quite to the end in cases of recent aseptic devitalization is a point very well taken. When I take out a normal pulp I would rather the filling would fall short than go through the end. The ideal method is to fill exactly *to the end.* In many cases where the pulp has been normal the terminations of the canal are filled with normal living tissue. Unless infection takes place and this tissue becomes gangrenous, it will remain vital and healthy for many years. When infection has persisted until periapical tissue is destroyed, then only should the filling go beyond the root-canal proper, but only far enough to cap the cementum exposed by the absorption of the pericementum. Filling a canal just to the end, while the most difficult of all root-filling, is not impossible of accomplishment. In the effort not to overfill the root, perhaps at first we underfill it, but a drop of chloroform placed in the chamber and worked in as described in the paper will in a large majority of cases make a perfect filling in those cases which otherwise might later on be seized upon by some fellow practitioner as evidence of our lack of skill.

Dr. Taylor's reference to surgical rest offers an important step forward should his theory be borne out. He suggested this method some time ago, but I have not had enough experience with it to know whether it is of any material assistance or not. I think, however, it is well worth trying out.

In closing the discussion I want to give a brief answer to the two questions asked in the subject of my paper. One, "When shall root-canals be filled?" The answer is, Only after the sterilization of the tissues has been demonstrated to a reasonable certainty. Under present conditions we cannot have an absolute assurance of this fact, but we can be certain that when we get a growth from a tooth it has not been sterilized. Second, "How shall root-canals be filled?" In such a manner that all dead tissue is covered with filling material, whether such dead tissue is in the canal or at the end of the root.

The meeting then adjourned until the evening session.

FRIDAY—*Evening Session.*

President Baskin called the convention to order at eight o'clock.

The PRESIDENT. We have with us this evening Dr. JOHN OPPIE MCCALL of Buffalo, New York, who will deliver an essay on "Primary Factors in the Etiology of Periodontoclasia."

[This paper is printed in full at page 1084 of the present issue of the COSMOS.]

DISCUSSION.

Dr. H. E. Kelsey, Baltimore. I had the pleasure of reading a copy of the paper which was sent to me by the essayist, and I was particularly interested in it from his viewpoint of the term traumatic occlusion. I think, however, that in the essayist's remarks during the showing of the lantern slides, he made clear a point that was not so clear in his paper as he intended to make it—that was the difference in the extent of the injury which could occur in traumatic occlusion in adults and young patients. The point he brought out was that often in an aged person or adult an occlusion might become traumatic which would not in a youthful patient. I believe this is true; a condition which would be certain al-

most to produce a pathological condition in an adult would only act as a stimulus in a youthful patient. I think the period of the adaptability of the teeth to occlusal stimuli decreases after the twelfth year, when molars have been formed and erupted and all the deciduous teeth have been lost. From that time on, traumatic occlusion can become very serious, and I do not doubt, in fact I *know,* that in some cases even previous to that time, if it is sufficiently marked it can become a very dangerous condition.

The paper as a whole pleases me very much, and I think it is to be classed with several others by men all of whom seem to be willing to exert painstaking care in their observations. Dr. McCall's paper is more valuable than it might seem on the face of it. It shows the work and study that has been given to conditions that have been almost overlooked in the past, and also the difference between diagnosing from evidence obtained from every possible source, and snapshot opinions rapidly handed out on the sole evidence of X-rays. I think we are to be congratulated on having had this paper presented to us here. I wish personally to thank Dr. McCall for his presentation of this subject, especially that portion to which I have referred and which especially interests me, and I am sure will interest all orthodontists when they have had an opportunity to read the paper.

Dr. H. R. Coppage, Baltimore. I want to add that Dr. McCall's paper is not over our heads; we can appreciate the fact that the pressure of one tooth over another will give trouble, and if the pressure is traumatic it should be remedied. A case came to my office in which a crowned tooth was giving trouble because the crown was striking the opposing teeth too hard. I trimmed the crown down, and kept trimming it down until the teeth were occluding properly, and as a result the patient is today wearing that crown. It was very well constructed, and no doubt will continue to give good service. I thank Dr. McCall for the excellent paper he presented to us, and appreciate the opportunity and privilege of being present to listen to and enjoy it.

Dr. B. L. Taylor, Washington. I do not know when I have heard a paper that has pleased me more than this one of Dr. McCall's, for the reason that it is very concise and scientific, and what has gratified me most is that we have been able to adopt terms for the various diseases around the superstructures of the teeth. The etiology has been worked out very beautifully, and to my mind the essayist has not overlooked a single factor in the cause of the disease. The matter of the frequency of the disease is one of the points which I think is of interest to all of the profession. He mentioned the fact that the profession at large is not looking after gingival irritations. This is a fact, perhaps, which is noticeable more to those who specialize in prophylaxis, or treatment of pyorrhea, but it is a well-known fact that gingival irritations are allowed to exist in mouths where we find beautiful operative work being done. It seems the majority of dentists feel that they must make beautiful fillings, and that then they have done all that can be done for the patient. What is the use of a beautiful crown or a beautiful bridge or filling if the structures which support those teeth are going to become diseased, and the teeth gradually loosen and have to be extracted? It is the duty of the dental profession to do better work along this line. Cleaning teeth as it is being done in a great many instances should be abolished. I have had dozens of patients in my office say, "Why, doctor, I have never heard of anyone taking as long to clean teeth as you take. Usually they take from fifteen minutes to half an hour to clean my teeth." I tell them, "That is a fact, but I have to remove about fifteen years' deposits that should have been removed before." That occurs among the better class of operators today. The man who treats pyorrhea should never have anything to do except to work on advanced cases of pyorrhea, and there should be fewer of those. Dr. McCall has told us plainly that it seems

almost impossible to believe that any general practitioner should allow any case of pyorrhea to progress to a serious condition. I realize that probably seventy-five per cent. of our patients are patients who were cared for by someone else at some time, and we are not responsible for those conditions entirely, but if we are not capable of coping with the disease it is certainly our duty to send that patient to someone who can treat the case properly. There are too many dentists who feel that it is impossible to cure these cases. I have had a man in my own town say to me, "I do not like to treat pyorrhea." Is he doing those patients justice in not telling them of the lesions and the conditions about the teeth, and giving them the very best service? It is the duty of the dental profession to give better service. I realize that one reason why it has not been possible to do better work is the fact that the instruments manufactured heretofore for the removal of deposits around the teeth were very crude. There are very few of them that can be used successfully. In many cases it has been a waste of steel to manufacture such instruments, and the dentists are responsible in that they have never required or never insisted upon the proper instruments to use for the treatment of these diseases.

There is one point that I would like to bring out in regard to the treatment of pyorrhea. As Dr. McCall has said, we want a healthy flow of blood to the tissues, and we must secure that by massaging and frequent brushing of the gums. I invariably go a step farther, however, and insist upon the thorough mastication of food. I insist on a diet composed of coarse foods and vegetables; such foods as spinach, lettuce, celery, cabbage, and watercress, and coarse breads of all descriptions. I do not recommend this diet simply for the effect it has in mastication, in exercising the teeth and massaging the gingival margins, but also for the effect it has on the alimentary canal. In the ordinary diet, where there is very little fibrous food eaten, there is a tendency to the formation of a pasty mass, which passes from the stomach into the alimentary canal and coats the intestines. There is something in the fibrous foods that stimulates the circulation as they pass into the intestines; they promote the flow of blood and produce a massage of the intestines. We thereby bring about a freer flow of blood, a better digestion, and a better assimilation of the foods, which eliminates any tendency to constipation. Chronic constipation can be cured by dieting and drinking plenty of water. This improvement in the systemic conditions when the local causes are removed will bring about a proper healing of those diseases.

Dr. McCall (closing the discussion). I appreciate very much the expressions that have been given here regarding my paper. It was my hope that I should be able to give you something practical. I had realized that in order to do that I would have to cover a good deal of ground. What I have stated has been said briefly; consequently I hope it will be possible for each one of you to read the paper if it gets into print, for in reading it you will get more out of it than by hearing it read. One of the things which actuates me in attempting to write papers or do any work outside of my office is my desire to assist, if I can, in enabling the profession to deal more capably with the diseases we are now speaking so much about. I wish to emphasize the fact that traumatic occlusion is excessive movement in the socket; in adults the movement is less marked than in children. When we have an excessive movement beyond the normal of the tooth in its socket, that is traumatic occlusion. I have presented five classes of periodontal diseases. I wished in a way that I could cut down that number, but I cannot do it. Black in his "Pathology" recognizes two classes of gingival and periodontal diseases. He mentions several others that do not fit in with either of those two classes. I do not believe we are going to gain anything by just considering two classes of disease, if there are five distinct types. I am very sure that I can point out each

one of those five types and frequently two or three types on one tooth, each of which has its own factors. Here is one very important point to remember—that every factor, primary and secondary, must be determined in diagnosing the case. If we discover two or three, but leave out the fourth, that fourth one will trip us up in treatment. There are two causes of our previous difficulties. One cause is a vague knowledge of the subject, not only by the general practitioner but by the man who thinks he knows something about it, and attempts to tell it. I am sure you have heard papers on the subject which were not at all clear, and I am attempting to clear this up for you by what I have given you. The other cause is lack of effort to master the technique of root surgery. When you have the instruments you must do some experimental work—work you are not going to be paid for—before you can expect to get results. I thank you once again for the very flattering reception you have given me.

The PRESIDENT. Next we will have a paper by a former resident of Baltimore, Dr. JAS. K. BURGESS of New York, who will read a paper on "Nature's Tolerance and Compensating Adjustments as They Relate to Oral Restoration."

[This paper was printed in full at page 986 of the November issue of the DENTAL COSMOS.]

DISCUSSION.

Dr. Geo. E. Hardy, Baltimore. Mr. President, each time I hear a paper from Dr. Burgess or hear him talk I wonder where he acquired that flow of beautiful language; he is never at a loss for the proper word to express his ideas, and his ideas are excellent. He is a practical man. I think the paper is a very desirable addition to our dental literature, and shall enjoy reading it over again when it is published. I repudiate his characterization of "assassin" for the practitioner who occasionally destroys a pulp to obtain proper anchorage. We have to construct, and there always arises the question as to practicability. We must secure sufficient anchorage with the greatest possible conservation of the tissues to which we attach abutments. Occasionally the necessity arises for destruction or devitalization of the pulp. I have never attained to the degree of skill Dr. Burgess has in securing sufficient anchorage in all cases without encroaching too closely upon the pulp for the safety of that organ. We find it necessary too often to devitalize the tooth in order to secure sufficient anchorage.

Dr. J. O. McCall, Buffalo. I want to compliment the essayist on his paper. This is one, among the other papers I have had the pleasure of hearing, which I commend for the good common sense shown in the discussion of the subject. We talk about men being practical and having good common sense but not being scientific nevertheless. Science is always practical; it is always common sense. When you are scientific, so called, at the expense of common sense or of being practical, you are not scientific. At the beginning of the paper the essayist takes up the idea that we must spare the teeth remaining in the mouth as much as possible in the construction of bridges, and he rather hints at a system of bridge work which he mentioned in detail, but not by the name of the inventor—perhaps I had better not mention him by name either.

The great difficulty with bridge work in the past has been that we have not observed all the factors which caused the failure of bridges when we see the abutments becoming loose. When we say that the failure of a fixed bridge is going to be due to the fixation of the abutments and inability to move those abutments independently, then we are failing to observe the real cause of the failure of fixed bridges—which is the occlusion. It is not the fixation of the abutments that causes the damage; it is the occlusion. You can put a fixed bridge in a mouth, and if your occlusion is properly attended to and your bands are accurately fitted, then you are not going to lose that bridge.

Dr. H. E. Kelsey, Baltimore. I do

not feel qualified to discuss this question, but want to say in reference to the papers of both Dr. McCall and Dr. Burgess that it is always a great pleasure to listen to papers such as these, because they evidence the same careful and thoughtful consideration of details relating to every side of the subject. It is interesting to one who has been on the side lines (as the orthodontist is in relation to this particular subject) to notice the swinging back and forth of the weight of opinion concerning those subjects which are no longer under our direct observation, or at least phases of dentistry which we do not treat.

Many of the most successful men still insist on putting in fixed bridges, while others pin their faith to removable ones, believing that success or failure lies in the style of construction and attachment. It is significant that some at least recognize that neither form of bridge can be successful if a traumatic occlusion is established, and this has been well portrayed this evening. Indeed, I do not know when I have heard so many well-considered and interesting things presented as at this meeting, and I concur with Dr. Burgess' idea, if I get it correctly, that it is better in putting in bridges to have an occlusion which is not what is termed normal, but is the best adaptation of the restoration to the mutilated conditions, than it is to seek to establish in every instance a normal occlusal relation of the bridge to the opposing teeth, when the malposition of those teeth would require such a shifting of the bridge from the established occlusal stress as to produce what either is or will become a traumatic occlusion.

I wish to thank Dr. Burgess again for occasionally coming back to his home town, and giving us the benefit of his hard work and research along these lines.

Dr. Burgess (closing the discussion). Dr. Hardy takes exception in a mild way to my strictures on pulp devitalization, because, as he says, he has to destroy pulps himself. So do I, and so does every other dentist engaged in the work of restoration, whether of individual teeth or of impaired dentures. But I destroy pulps—as Dr. Hardy does—under pathological necessity, or where the requirements of the organism demand restorations of such a nature that the engineering necessities of the case leave no alternative. My quarrel is with two classes of men: First, those who ruthlessly destroy a pulp without any consideration of its functions or the consequences which may follow. Second, the class of men to whom the niceties of mechanical execution—the love of tinkering, the external, the superficial—have an appeal that blinds them to the dangers to which their meddlesomeness exposes the whole systemic welfare. No dope fiend was ever more transported with his soothing potions than a removable bridge operator seems to be with the enslaving fascinations of his split pins and sliding crowns and other products of his mechanical art. If the tinkering were all done out of the mouth nobody would care, but it begins in the mechanical laboratory and ends in the root-canal, where that marvel of nature's handiwork, the dental pulp, must needs be sacrificed to make a tinker's holiday.

They talk of prophylaxis and sanitation as if these things had their beginning and ending in the oral cavity. It would be interesting and no doubt appalling as well to know how many infected hearts and kidneys and joints and other organs and tissues have paid the penalty of such men's lack of perspective and their silly insistence upon a microbeless mouth, let come what may to the rest of the organism!

Dr. Baskin wants to know my present attitude toward the shell crown, and I am very glad to answer his question. I have established as the four cardinal principles of all my own efforts at restoration surgery, engineering, art, and workmanship. These fundamental principles constitute what I call my "standard of perfection." I do not consider any method or measure, any system or technique, as an end in itself, but as a means to an end, and I check up the efficacy and the efficiency of every method and measure, of every system and technique, by this standard of perfection. I do

not vary my attitude toward the shell crown. Whenever I find it the choice of evils from these basic points of view I use it, and though the cases are rare they do occur. One very recent case presented such a condition. Briefly, it was a third molar, far short of the occlusion and so shaped and in such relation to the soft tissues as that it was scarcely necessary to touch any surface of it with a stone to shape it for a shell crown; whereas any interior method of attachment would have necessitated the usual amount of preparation. Now, the ends of good surgery demanded that that tooth be dealt with, other features being equally satisfactory, in the manner that required the least destruction of tissue. There was no question of the shell crown meeting all the engineering requirements. The tooth being far back and entirely out of view, the considerations of art were so minimized as to be merely sentimental. The workmanship in the case of the shell crown, as in everything else, is what we make it, though I have no hesitancy in saying that in all the realm of restoration there is no operation I know of that is so difficult, when one considers the entire operation from preparation to finished result, as the shell crown.

In some cases when a bridge with shell crown attachment is to be replaced it is found on its removal that the abutment teeth have been so ground away in the former preparation that one must choose between the shell crown on the one hand, and extirpation of the pulp for interior anchorage on the other. In such cases, where the considerations of art will at all admit of it, I choose the shell crown as the lesser evil. But taken all together and considering every class of case where I use the shell crown, it forms an insignificant feature of my restorative work.

I thank Dr. McCall for his part in the discussion, but especially for his own paper. To one who has worked in pyorrhea it is peculiarly interesting. My own paper proved in a measure to be a discussion of his, particularly of the part given to the consideration of trauma. That part of the dental profession engaged in the work of restoration will learn the baleful influence of trauma, the relation of anchorage and occlusion, of stress and resistance, and of all these to trauma, and so to correlate and co-ordinate these forces as to procure the maximum of service without trauma inherent in any given foundation through the medium of a *rational* occlusion.

Dr. H. P. Cobey, Washington. I have been in silence from Wednesday until this time. The Essay Committee asked me some time ago to contribute something to this meeting. Conditions in Washington are unusual; the demands made on men in that city are rather unusual. As the time for this meeting approached I thought, for my own good, however, that it would be well for me to throw aside my duties temporarily, and spend the time here. I have attended this meeting from its beginning until this time, enjoying immensely the most excellent papers which have been given, and the fine clinics that have been shown. The thing which has struck me with the greatest force is the well-balanced program as arranged by the Essay Committee.

First, Dr. McCall's paper, dealing with one of the most troublesome conditions which the profession has to meet, was very interesting. He has very beautifully classified the conditions that come up under periodontoclasia, and suggested remedies for certain of those conditions; he also touched upon operative procedures.

We have had a fine presentation of the operating end of our profession by Dr. Conzett. If we have learned anything at all from Dr. Conzett's paper we have learned this—that by certain methods of operative procedure we can protect the septal gingivæ, which will prevent some of the troubles that were included under the head of Dr. McCall's paper.

We had an able paper by Dr. Crane. He told us or pointed out to us the classification of infections resulting from pulp exposures and troubles subsequent thereto. I think I can say that he has

presented one of the most scientific papers on that subject that has ever been given up to this time. He has not only classified these troubles, but he has in an orderly way undertaken to show how we might treat these conditions, and the class of cases we might find favorable for treatment.

Following Dr. Crane's paper we had presented to us by Dr. Sausser a splendid paper dealing with that class of cases requiring root resection for relief, the technique of which he very clearly described. We have also had Dr. Burgess' paper, in which he points out how nature will tolerate abnormal conditions, making it possible to substitute artificial devices. How well these papers are connected up! He tells us that where we have lost certain teeth and there are still others remaining, nature will permit us to use those remaining as abutments for bridges, supplying the vacancies. And I think he is absolutely right.

Next we have Dr. Patterson telling us how to mount and articulate the teeth so that they may be worn and used with comfort.

I have never attended a meeting where I have seen such a well-arranged program, one that so completely covered the field, and I feel that I am very fortunate to be able to attend a gathering of this sort and enjoy it as a silent listener. I have profited immensely, and think that your association is to be congratulated on being able to have gotten together such a program; and the other men from Washington I know have enjoyed it.

The President. I want to express at this time our generous appreciation of the efforts of the essayists, and to assure you of our appreciation. I ask a rising vote of the society to the essayists. (The meeting rose in accordance with the president's request, and gave a rising vote of thanks.)

The meeting then adjourned.

Connecticut State Dental Association.

Fifty-fourth Annual Convention, held at New Haven, April 18-20, 1918.

(Continued from page 820.)

Friday—*Afternoon Session.*

The meeting was called to order at 2.45, Friday afternoon, April 19th, by the president, Dr. Bryant.

Mr. Samuel G. Supplee of New York City, gave a talk on "The Classification of Tissue Conditions in Partial and Edentulous Cases."

[This lecture was in substance the same as the paper read by the author before the New Jersey Dental Society, and published in the November issue of the Dental Cosmos at page 996.—Ed.]

Dr. Norman S. Essig of Philadelphia, Pa., then gave an illustrated talk on "The Selection of Teeth in Articulation."

[This lecture was practically the same as that given before the Maryland State Dental Association, and published in the present issue of the Dental Cosmos at page 1108.—Ed.]

The next item on the program was a lecture by Dr. Edward Kennedy, New York City, on "Vulcanizing and Finishing Dentures."

[This lecture will be published in an early issue of the Dental Cosmos.—Ed.]

The next item on the program was a paper by Dr. J. A. TURNBULL of Boston, Mass., entitled "Anaphylaxis in Connection with Asthma, Hay Fever, and Various Skin Diseases."

[This paper is printed in full at page 1112 of the present issue of the DENTAL COSMOS.]

Dr. GEORGE H. WRIGHT, Boston, in collaboration with Dr. Turnbull, prior to the discussion, gave a lecture on the same subject, as follows:

Mr. President, ladies and gentlemen, —Dr. Turnbull has given you a graphic illustration of how he determines the reaction to the proteins from various sources, whether wheat, or meat, or fish, or milk, or eggs. He tells you he washes the forearm with alcohol and takes a very weak solution of some of these articles of food, or clothing, or fur, or catskin, or dogskin, and makes a minute scratch, and in a very little while whatever that patient is particularly sensitive to, or reacts to, will show up better than anything else. He may have twenty different slight inoculations on the arm, and only one out of the total will give marked reaction, which appears usually in about ten minutes' time. This reaction shows as a circle about the size of a quarter, very red, and it comes on within ten or twelve minutes. After a quarter of an hour or half an hour it fades, showing that that individual is sensitive to that particular protein.

All mankind is made up of a complex chemical compound—no two of us essentially the same. I suppose that, in a sense, the difference is in our chemical makeup, which accounts for differences in mentalities as well, because we do react according to what we have within ourselves or what we represent in a sum total.

That is why in the olden days they had a saying, which you have often heard, "What is one man's meat is another man's poison"—and it is true. There are people here who know from their own experience that they cannot eat cheese, onions, eggs, oysters, or salmon without some marked disturbance. It is the ability to take care of the proteins which are associated with these different articles of food which enables us to tolerate them, and not react uncomfortably to their presence. That is why one man can take three or four cups of coffee, or smoke six or seven cigars, and be perfectly comfortable; whereas another man would not be.

They have told us of this anaphylaxis —that from grasses, wheats, or meats we absorb certain of the proteins; and we may take them in in two particular ways: We may get absorption through the mucous surfaces of the body, through the respiratory tract, or we may be involved through what we have digested in the alimentary canal. That concerns us as dentists, because we are dealing with teeth which should prepare our foods through mastication for assimilation. We are told that proteins are made up of an acid and a base, and toxins, whether tolerated or not, are the result. When we speak of split proteins it means that the acid is separated from the base. Take away the base, and you have the acid.

I do not believe physiological or biological chemistry is all known today; much has to be learned. When we have diseased teeth we have about those teeth split proteins which are capable of becoming absorbed. When there is an acid near a bloodvessel or in the region of blood it prevents the coagulation of the blood. It renders the blood in that vessel or capillary so fluid and watery that it is taken up very readily in absorption.

We have, then, to consider the question: What becomes of the products of decomposition within and about the teeth, or the apical abscess, the first beginning of the alveolar abscess, or any degenerated product? Nature has given us walls of defense and means of defense, not only micro-organisms but other products, and chief among them is the highly vascularized tissue which is about the teeth. Dentists are learning more and more to respect those tissues. If a tooth becomes diseased from within the pulp, and you get the first expansion of the peridental membrane, and a breaking down of the bony tissue and a beginning of the granulomatous mass, you

have an evidence of what nature is doing in the way of trying to defend herself against what is being introduced there. You may know that the streptococcus viridans, when there is no oxygen present and the part cannot be bathed in sunlight, can be the most deadly organism that man has to deal with. Remote in its recesses, it produces many reactions. There must be a function for a cell; there must be something coming and something going, otherwise it ceases to function.

Round about the apex of the tooth, then, we have a walled-off membrane whose contents are capable of producing inflammation and irritating products. But those products do not stay there; they are given up, and as long as they are given up the micro-organism flourishes. How does that product become disposed of? There is a law throughout the entire body—the osmotic law—which governs the interchange of fluids. It is true within the interstitial tissues, it is true in the lungs and in all organs and glands, in bone, and in muscle. Wherever there is a fluid circulating and a fluid adjacent, even though there may be a membranous wall separating them, there will be an interchange. If you place a colored salt solution in a membrane, and place that membrane in some sterile clean water, in time you will see an interchange of the fluids. Under pressure, under the activity of muscular movement, under the normal functioning of the body, that process is active.

The whole body is bathed in lymph. If you take a section of the body you will find those lymph spaces bathed with fluid. That fluid is of less concentration than the products of bacterial activity, and the law of osmosis takes place wherever that fluid may be, even in the fluid contents of a cell. It does not always follow that that is a nutritive fluid, but the fact remains that there will be an interchange. If you have an abscess sac at the end of a tooth root filled with the products of bacterial activity, you will get a plus and minus interchange. You will get a flowing of the toxins or split proteins through the thin wall of that sac into the adjacent lymph space, and from there a diffusion which can easily go to the valves of the heart, glomeruli of the kidneys, or which can easily irritate the nerves, or start new bone growth as a walled-off factor against the secretion, that could give you arthritic symptoms in your muscles, that can cause deposition of the calcium urates in the region of the synovial fluids, cause degeneration of any mucosal surface in the body, particularly in the antrum or nose and throat, where polypi may be manifest. That is the working theory which I have in my mind—the mechanism of the process of absorption and of the bacterial absorption around the teeth.

Personally I have had six cases of asthma and acute bronchitis which have been relieved after extraction and curettage. They have been examined in every possible way. We have blood tests and urinary examinations, examinations of saliva, and in five out of those six cases the patients show reaction to pus-forming bacteria. Two were staphylococcus, one was staphylococcus aureus, and the others streptococcus viridans. One patient could scarcely walk across the floor without labored breathing. The men who were working on these patients and trying to check up the possible source of the foci said there must be something wrong with the teeth. The tonsils had been removed in two cases, the appendix had been removed from another, and we could not lay the blame there. Everything had been eliminated which could be blamed as a source of infection.

Now as to the teeth. The teeth had been X-rayed indifferently. I saw some of the original plates. Four interpretations had been made. One case in particular showed very little about the tooth roots, excepting the area on the upper right side extending from the first bicuspid to the second molar. The X-ray did not show anything particularly wrong with that section. Yet the man could scarcely breathe, had to sit up nights, and had not been able to work for two years. He showed a reaction to the streptococcus viridans. On a chance I removed a bridge, and found some de-

vitalized teeth under the bridge. I dissected back the tissues very carefully and came to the mucosa of the antrum, being careful not to break into the antrum, because it had been carefully washed out through the naso-antral wall. I know that that man came to report later on his own account, to tell us how well he was getting along, although he had been for a long time previously in the Massachusetts General Hospital. He was free from all asthma symptoms. I am sure Dr. Turnbull will recall this patient.

That is my testimony, and that is where I wish to connect with the work Dr. Turnbull is doing in his search for the protein reaction. There may be no absorption, and in consequence the micro-organisms will stew in their own juice; they cannot survive. But if the products of their activity do get free and are diffused and go into the system, you may be prepared for a number of things, even iritis. I am now studying this problem at the Massachusetts Eye and Ear Infirmary.

We must be on guard to protect our patients against focal infections within the mouth, because the protein absorptions may include a manifestation of asthma or bronchitis, as Dr. Turnbull and our clinical observations are demonstrating.

DISCUSSION.

Dr. Weston A. Price, Cleveland, Ohio. I wish to express my appreciation of the splendid paper and presentation of Dr. Turnbull. I would like to ask him if he would suggest whether there is a differentiation between different strains of the same organism. Do you find it necessary to differentiate? Also, do you find you can retain the toxin without retaining the body of the protein?

Dr. Turnbull. In regard to the different strains of the staphylococcus and streptococcus, you can make your test and use any stock vaccine.

Dr. Price. Would you say that a vaccine made from any strain of viridans would produce the same reaction?

Dr. Turnbull. We are working on that, but I am not yet prepared to say; they are very closely related. We have had great difficulty with viridans, and in this work we have had great difficulty in getting media to produce large enough quantities for this work.

Dr. Price. Do you make your test with the vital organism?

Dr. Turnbull. Yes, with protein. We take the bacteria and grow them in quantities, and wash them of media; centrifuge; re-wash, to acquire solution of bacteria. Then add four volumes of ninety-five per cent. alcohol and throw down a precipitate. That is again re-washed with alcohol. The alcohol is thrown off, the precipitate washed with acetone and ether, then washed with ether and acetone again, and again with ether, and then dried. Do not think the toxin has any effect; it is mainly the protein and the absorption of the protein that we are using. We can test these proteins. We can use the same bacterial proteins in dilute forms for desensitization, and get the same results as with vaccines. That is what I have been working on in connection with the growth of the bacteria. One thing we must watch out for is in washing off and getting out a certain amount of the media. I made a number of experiments in that line, using sterile water, precipitating it and throwing down the protein of media bacteria, and had many reactions. No doubt in a number of cases in the inoculations for typhoid and paratyphoid, very many of the disturbances are caused by the media. I think using the protein from which that is all taken out has a better effect. We can weigh out a certain amount and make our dilution, whereas with the bacterial vaccine variations occur.

The meeting then adjourned until 8 o'clock.

FRIDAY—*Evening Session.*

The meeting was called to order at 8.30 o'clock, by the president Dr. Bryant.

Dr. BRYANT. We are holding a joint session this evening with the Connecticut

State Hygienists' Association. This is the fourth year we have met together, and I wish to extend to the Hygienists' Association, through Mrs. Hart, the president, the courtesy of introducing the speaker of the evening.

Mrs. Hart. *Mr. President, ladies and gentlemen,*—I wish to express our appreciation of your courtesy in permitting us to join with you in your annual convention.

Tonight our associations are honored by having as our guest the director of the Research Institute of the National Dental Association, Dr. Weston A. Price of Cleveland. Dr. Price and his coworkers are doing much toward solving many of the problems which confront dentistry, and I am sure it will be an inspiration to all of us to hear him this evening on the subject of focal infections.

I take great pleasure in introducing Dr. Price.

Dr. Weston A. Price of Cleveland, Ohio, made an address on the subject of "Septic Root-canals—Filled and Unfilled—and Their Relation to Localized and Systemic Diseases."

[This lecture is not published here for the reason that no revised manuscript has been received from the author.—Ed.]

Mr. L. J. Weinstein, New York. You have all probably heard about the shortage of platinum, and the need of the Government for platinum in the conduct of the war. Dentists are concerned about what is going to happen to them, and there is both a patriotic and personal interest in the matter.

I have fortunately (or unfortunately) been engaged in aiding the Government in the conservation of platinum, and my present task is to give the subject some publicity, with the principal object of asking you to hold whatever platinum you have. Do not dispose of it to anybody until the Government tells you what to do with it.

The material I will read to you may sound peculiar, but it is prepared for publication, and you must bear with me in the form in which it is written. The article on conservation will be printed in the May *Dental Digest,* and the publishers have agreed to furnish a reprint to every non-subscriber.

Mr. Weinstein then read the article on "Conservation of Platinum in Dentistry," published in the *Dental Digest* for May 1918.

The meeting then adjourned to 9.30 o'clock Saturday morning.

Saturday—*Morning Session.*

The meeting was called to order by the president, Dr. Bryant, at 10 o'clock.

The society then took up the report of the Committee on Amendment of the By-laws, and after several revisions and amendments were made it was agreed to leave the final revision for adoption at the next annual meeting.

The Secretary read the list of applications for membership.

Dr. Beckwith-Ewall. I move that the secretary be instructed to cast one ballot for the list of applicants.

The Secretary cast one ballot, and the candidates were declared elected.

The Secretary read an invitation from the New York State Dental Society, inviting the members of this society to attend their fiftieth anniversary meeting on June 13, 14, and 15, at Saratoga Springs.

A motion was made that the invitation be received and placed on file, and that our president reply to the same with thanks. (Motion carried.)

The Secretary read a letter from the Research Institute asking for a list of historical places or libraries where information could be obtained in regard to the history of dentistry.

The Secretary read a communication regarding the clinicians to be sent to the National Association meeting to be held in Chicago, in August.

Dr. T. A. Ganung, Bridgeport. I move that that matter be left to the incoming president. (Motion carried.)

The Treasurer read a list of delinquent members for 1916, '17, and '18, saying that all of them had received registered letters.

Dr. BECKWITH-EWALL. I move that these names as read, of men three years in arrears and taking no interest in the society, be dropped from the roll. (Motion carried.)

REPORT OF THE EXECUTIVE COMMITTEE.

Dr. M. J. LOEB, chairman. The Executive Committee wishes to report that it has audited the Report of the Treasurer, and finds it correct. It also wishes to report that through the efforts of the state board, and also through some other effort on behalf of the State Society, a number of men have been brought to court and fined for practicing illegally.

We have received a considerable amount of assistance from Dr. Geo. B. Palmer, and the Executive Committee wishes to extend in open meeting an expression of thanks to him for his efforts.

Dr. RULE. I move the acceptance of the report, and the adoption of the recommendation made by the committee. (Motion carried.)

The SECRETARY. Would it be possible at this time for the society to purchase another Liberty bond? We have over $1200 in the savings-bank, and it would seem we could purchase another bond.

I make that as a motion, subject to the judgment of the Board of Censors.

Dr. SEARS. I am personally in accord with the idea of purchasing all the Liberty bonds we can, but we do not know just exactly where we are at the present time. We do not know how fast our money will come in from the exhibitors, or how fast the dues come in. Although we have $1200 in the bank today, we may not have much left, as many bills may be coming in tomorrow. I would rather put it in a form that if we have sufficient money left after paying our bills, we buy a $500 Liberty bond. I make that as an amendment. (Motion as amended carried.)

Dr. HUNT presented the following resolution:

Be it RESOLVED, That we, the members present of the Connecticut State Dental Association, after hearing the work and aims of the Dentists' Mutual Protective Alliance discussed, give the Alliance our indorsement, and recommend that every dentist in the State of Connecticut support this organized effort to eliminate process patents from the dental profession.

Dr. A. C. FONES. I am opposed to this society indorsing the action of this Mutual Protective Association until we know more about it. I do not think we want to act on anything like this hastily at the eleventh hour, when we are about to adjourn, without thoroughly investigating it.

I would make that as a motion, that we postpone action on this resolution until next year. (Motion carried.)

REPORT OF THE NOMINATING COMMITTEE.

Dr. GANUNG, chairman of the Nominating Committee, reported as follows:

President—B. A. Sears, Hartford.
Vice-president—G. S. B. Leonard, Mystic.
Secretary—Morton J. Loeb, New Haven.
Treasurer—Frank J. Buchanan, Waterbury.
Executive Committee—J. F. Barton, Hartford, Wm. J. McLaughlin, Bridgeport, Ralph Keeler, New London.
Editor—O. T. Rule, Stamford.
Librarian—John L. Beach, Bristol.

Dr. SCHLOSSER moved that the report of the Nominating Committee be accepted as read, and that the secretary be instructed to cast one ballot for the officers as nominated.

The Secretary cast one ballot, and the officers were declared elected.

The PRESIDENT. I want to take a moment to extend my sincere appreciation to the Connecticut State Dental Association for the support they have given me during the past year. I cannot tell you how much I appreciate it, especially the support of the chairmen of my committees. We have, I think, worked more as a unit than have any committees since I have been in association work. And I

especially want to thank the chairman of the Executive Committee, who took the whole burden of the work while I had to be away for a rest. I assure you I appreciate very much the honor you extended to me, and thank you very much for the support you have given me.

I will ask Dr. Riggs and Dr. George McLean to conduct the president-elect to the chair.

Dr. BRYANT. Dr. Sears, I hope the association will give you the same loyal support they have given me.

Dr. SEARS. I thank you from the bottom of my heart. I will not make a speech. The first thing I will do will be to appoint the chairmen of my various committees, for I am in the Dental Reserve Corps, and I do not know when I may be called away.

I want the meeting next year to be a success, and I want every man in the association—from east to west, and from north to south—to take hold and help.

The following were appointed

CHAIRMEN OF COMMITTEES.

Committee on Essays—Chas. McManus, Hartford.

Committee on Clinics—A. E. Cary, Hartford.

Supervisor of Clinics—E. A. Spelman, Hartford.

Committee on Exhibits—G. O. McLean, Hartford.

Committee on Dental Legislation—A. C. Fones, Bridgeport.

Program Committee—A. A. Hunt, Hartford.

Press Committee—S. L. Beckwith-Ewall, Hartford.

Committee on Entertainment—The President and Hartford Dental Society.

Reception Committee—Chas. A. Humphreys, Hartford.

Committee on New Members—E. P. Anderson, Hartford.

Committee on Necrology—E. S. Gaylord, New Haven.

Dr. MCLEAN moved a vote of thanks to the retiring officers. (Motion carried.)

Dr. MCLEAN moved a vote of thanks to the DENTAL COSMOS, to Dr. Anthony and his staff, for the publication of the proceedings. (Motion carried.)

Dr. LOEB moved a vote of thanks to the hotel management for its co-operation in making the meeting a success. (Motion carried.)

Dr. BECKWITH-EWALL moved a vote of thanks and appreciation to all the essayists and clinicians who helped to make the meeting a success. (Motion carried.)

There being no further business, the meeting then adjourned.

THE DENTAL COSMOS

A MONTHLY RECORD OF DENTAL SCIENCE.

Devoted to the Interests of the Profession.

EDWARD C. KIRK, D.D.S., Sc.D., LL.D., *Editor.*
L. PIERCE ANTHONY, D.D.S., *Associate Editor.*

PUBLISHED BY THE S. S. WHITE DENTAL MFG. CO., PHILADELPHIA, PA.

SUBSCRIPTION PRICE, including postage, $1.00 a year to all parts of the United States, Hawaiian Islands, the Philippines, Guam, Porto Rico, Virgin Islands, Cuba, and Mexico. Canada, $1.40. To other foreign countries, $1.75 a year.

Original contributions, society reports, and other correspondence intended for publication should be addressed to the EDITOR, Lock Box 1615, Philadelphia, Pa.

Subscriptions and communications relating to advertisements should be addressed to the BUSINESS MANAGER of the DENTAL COSMOS, Lock Box 1615, Philadelphia, Pa.

PHILADELPHIA, DECEMBER 1918.

EDITORIAL DEPARTMENT

Dentistry in Relation to Reconstruction.

THE United States of America entered the world-war on April 6, 1917. Hostilities ceased November 11, 1918, with democracy triumphant over autocracy. The principles of human liberty and self-government for which the fathers of our republic fought the war of independence nearly a century and a half ago, and then wrought into the fabric of our national life, have now become the priceless heritage of all civilized mankind. From the agonies of more than four years of war in which the instincts of hellish ingenuity were expended to their limit in devising means to thwart the efforts of humanity to control its own destiny, peace has issued, a new era of new ideals is created, and amidst the joyous acclaim of a liberated world the birth of social and political free-

dom is signalized. Verily, "A woman when she is in travail hath sorrow because her hour is come, but as soon as she is delivered of the child she remembereth no more her anguish for joy that a man is born into the world."

The era of reconstruction now confronting us involves much more than reconstruction in a national sense; it involves a new angle of view toward all of our life problems, a reorientation of the individual as well as of the national attitude of mind toward its new responsibilities. No individual, no field of endeavor can escape the urge of the new world-spirit in shaping the activities of mankind. For nineteen months every interest in this broad land of ours—every individual, has contributed each in his degree toward the winning of the war; the mind, the energy of the nation has been intensively focused on that single objective. All of our resources have been dedicated to the common purpose, and the end has come triumphantly in a moral as well as in a national sense. The world-war thus becomes the background of all future human development and endeavor, because of the revolutionary changes, physical and intellectual, which it has wrought, and for the same reasons it becomes the foreground of a new era in human progress.

In the light of the foregoing it is important to consider the effect upon dentistry wrought by the war period, and what suggestions the experiences thus gained offer for the future direction of dental activities, especially with respect to the larger public relationships of our profession.

We entered the conflict with an organized Dental Surgeons Corps for both the army and navy, and as the essential character of the service as a factor in maintaining the physical efficiency of our fighting units became manifest, it was found that the allotment of dental surgeons to *personnel* was inadequate, so that an increase to approximating ten thousand was authorized in the army dental surgeons corps, the present standard making an allotment of one dental surgeon to each 500 of the army *personnel.*

Government recognition of the essential importance of dental service to the health of the army was further evidenced by the Act of Congress of October 6, 1917, granting increased rank to the dental corps. In the field, in base hospitals, in the cantonments, and throughout the entire military establishment, the service

of the dental corps has justified itself as an indispensable element of the general military medical activity.

Collateral to the organized military dental service of the Government, the Preparedness League of American Dentists was created as a voluntary service by the civilian dental profession—its object being to eliminate the dental disabilities of recruits before their enlistment. We have from time to time published reports setting forth the extent of membership and the results accomplished by this patriotic dental organization. The figures are impressive, but what is of much greater importance as affecting the future status of the dental profession is the convincing argument which the work of the army and navy Dental Corps and that of its adjuvant the Preparedness League of American Dentists offers as to the importance of the public service relationships of dentistry. Before the war, dentistry was subject to no little criticism for its lack of practically expressed interest in public health service; but the war service of dentistry has educated the public to a realization of the importance of dental service, and it has revealed to the dental profession itself the desirability of rendering that service. It is just this great educational result that needs now to be capitalized and organized for the benefit of the public and the dental profession as well.

With demobilization the military objective of the Preparedness League will vanish, but this great organization should be held together and its energies utilized in civilian channels. Divested of its military purposes, its essential reason for existence is still the same, viz, the altruistic service which dentistry can render in connection with the public health. This is concerned with dental service in schools, hospitals, eleemosynary institutions, industrial establishments, and all avenues by which the general public in the larger sense can be reached. The democratization of social, industrial, and commercial activities, now the keynote of the reconstruction period, must also include the democratization of dental service.

Moreover, there is yet much to be accomplished in reorganizing the dental profession and its public service upon an autonomous basis of control; by which we mean the freeing of dental activities everywhere from the hampering interference of medical direction and placing it under the control and supervision of its own membership. No organization is better fitted to do this work on broad

lines than the Preparedness League. Dental societies are handicapped by a local "provincialism" that is not a hampering factor either in the objectives or activities of a nation-wide group such as the Preparedness League. By all means, then, let the League be kept intact, so that its energies may be directed toward the objectives of dental service in the era of peace as they have been so successfully enlisted in the winning of the war.

Bibliographical

Principles and Practice of Filling Teeth. By C. N. Johnson, M.A., L.D.S., D.D.S., Professor of Operative Dentistry in the Chicago College of Dental Surgery; Editor of the *Dental Review*. Fourth Edition, revised and enlarged, with 127 illustrations. Philadelphia: P. Blakiston's Son & Co. Price $3.00.

The author avows that his principal aim in preparing this book has been "to direct attention to some of the causes of failure in filling teeth, and to offer suggestions relative to possible improvement in methods of procedure." To accomplish this he has systematized and emphasized some of the recent advances in practice. The principal alterations from foregoing editions may be itemized as follows: (1) The chapter on the Cast Gold Inlay has been entirely rewritten (Taggart's process is followed); (2) the subject of Root-canal Filling has been changed and elaborated; (3) Oral Prophylaxis has received a recognition more worthy of its importance.

It would have been better to have omitted any reference to the etiology of dental caries than to present that vital, intricate, and even yet obscure subject in the totally erroneous and misleading form offered in this work. From the description the beginner would never gain the concept that substances of a carbohydrate nature, acted on by zymogenic bacteria, yield the acid to dissolve the inorganic constituents of enamel and dentin. There is absolutely no mention of the second phase of the disintegrating process, viz, the proteolytic action of bacteria on the organic matrix of dentin. And the bacterial plaque, which localizes the organisms, is ascribed to the long-ago exonerated "gelatin"-forming micro-organisms. As far as concerns the etiology of dental caries in a work of this nature, the sin of omission would have been insignificant in comparison with the sin committed. This incident, while trivial in itself under the circumstances, exemplifies the most serious criticism which can be made of this work.

While in numerous statements Johnson has acknowledged the right by virtue of the doctrine of oral foci of systemic disease to select and to eliminate any given operative or prosthetic method, he has neglected to apply this criterion in all instances. For instance, "As a tem-

porary sealing agent in the treatment, it (gutta-percha) is, without question, the best material we possess" (page 146) is a statement which will be questioned by those who have a proper regard for the exclusion of micro-organisms from the canals during treatment. The importance of this is recognized by Johnson on page 252, but in a somewhat different connection.

In the chapter on the Destruction of the Pulp there is no mention of anesthetization by nerve-blocking. Johnson depends on arsenic trioxid and pressure anesthetization with cocain or novocain, with a predilection for the arsenic trioxid. For the sterilization of putrescent canals Johnson relies on Buckley's tricresol and formalin. Some will think that too much optimism and tolerance are manifested toward porcelain inlays. The sterilization of dentin after cavity preparation and before insertion of the filling material deserves far more consideration and insistence than it receives on pp. 126–9. In reality we find but a single sentence given to this subject.

Cavity preparation is a subject which today does not permit of much latitude in presentation. Yet in a modern textbook it would seem advisable to establish its principles upon the rational basis of the minute structure and architecture of enamel and dentin. (See F. B. Noyes, "Dental Histology and Embryology," 1915, ch. 6 to 11, incl.) The importance of this is here more casually implied than emphasized. The illustrations of this chapter could with advantage be more numerous and on a larger scale.

Methods are described simply and clearly. They are presented with the informality and vividness of a practical demonstration. This humanizing influence is repeatedly illustrated by the injunction to the future practitioner to consider the preferences and even the whims of the patient wherever such acquiescence will not lower the quality of the work. Nowhere does this attitude find more persuasive expression than in the section dealing with hypersensitive dentin (pages 129–36).

Blakiston's books are well produced, and this is no exception to that rule. The whole appearance of the book is most pleasing and satisfactory.

Books Received.

Books received are acknowledged in this column, and such acknowledgment must be regarded as a sufficient return for the courtesy of the sender. Selections will be made for review in the interests of our readers and as space permits.

"Mammalian Dentition." By T. Wingate Todd, M.B., Ch.B.Manch., F.R.C.S.Eng., Captain, Canadian Army Medical Corps, Henry Willson Payne Professor of Anatomy, Western Reserve University, Cleveland, Ohio; formerly Lecturer in Anatomy, Victoria University of Manchester, England. With 100 illustrations. St. Louis: C. V. Mosby Co., 1918. Price $3.00.

"Practical Dental Metallurgy." A Text and Reference Book for Students and Practitioners of Dentistry, Embodying the Principles of Metallurgy and Their Application to Dentistry, Including Experiments. By Joseph Dupuy Hodgen, D.D.S., Professor of Operative Dentistry (formerly Professor of Dental Chemistry and Metallurgy), College of Dentistry, University of California. Revised by Guy S. Millberry, D.D.S., Professor of Chemistry and Metallurgy and Dean of the College of Dentistry, University of California. Fifth Edition, completely revised. St. Louis: C. V. Mosby Co., 1918. Price $2.50.

"The Surgery of Oral Diseases and Malformations, Their Diagnosis and Treatment." By George VanIngen Brown, D.D.S., M.D., C.M., F.A.C.S., Major, Medical Officers' Reserve Corps, U. S. Army, Oral Surgeon to St. Mary's Hospital and to the Children's Free Hospital and Columbia Hospital, Milwaukee, etc. Third Edition, with 570 engravings and 20 plates, and a selected list of examination questions. Philadelphia and New York: Lea & Febiger, 1918. Price $7.00.

Practical Hints

This Department specially welcomes the brief presentation by our readers of any novel suggestions or methods which in their own practice have proved to be time-saving or to possess other features of advantage.

A Dental Trocar.

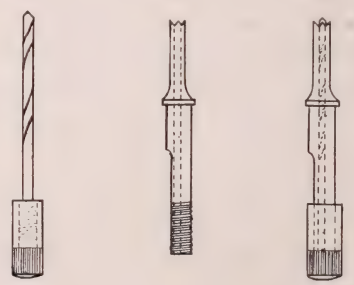
By L. D. CORIELL, D.D.S., Baltimore, Md.

During the last four or five years, as we all know, there have been noted an unusual number of systemic diseases having had their origin from dental infections, and as a result there has been a slaughter of the so-called infected teeth where the diagnosis has been made exclusively by radiographs. Having had fourteen years' experience in radiographic work, I know that in a great many cases a radiograph is practically worthless as a diagnostic aid, and as a result of this known fault, after two years of experimenting, I have evolved the instrument that I have called the "Coriell Dental Trocar," which I shall endeavor to describe, explaining the technique necessary for its use.

We know that it is impossible to get an uncontaminated culture from periapical tissue through the root-canal, and we also know how difficult it is to get one from an extracted tooth, it being almost impossible to extract without contamination. I have therefore adopted the only way possible I know of to get a culture uncontaminated, *i.e.* through the alveolar process.

The instrument that I use is a small trephine driven by the dental engine in a right-angle handpiece. The trephine has the hole in it closed by a twist drill that projects about 1 mm. beyond the tooth end of the trephine; after the trephine has been driven into the suspected area the drill is withdrawn, leaving the trephine in place, a platinum needle is inserted through the trephine into the suspected area, and culture taken in the usual way.

Fig. 1. Fig. 2. Fig. 3.



In detail, Fig. 1 represents the drill, Fig. 2 the trephine, Fig. 3 the assembled trocar, and Fig. 4 the trocar in the handpiece. Figs. 5 and 6 show the method of obtaining the culture.

The technique in detail is as follows: After having selected the spot over the apex of the root from which we wish to obtain our culture, we first inject a small quantity of novocain or some other

suitable local anesthetic some little distance from the spot where we are to make our puncture. After anesthesia has been obtained, we cauterize, either with iodin

Fig. 4.

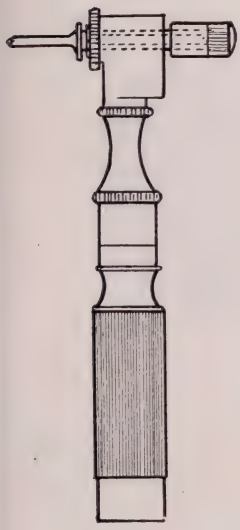


Fig. 5.

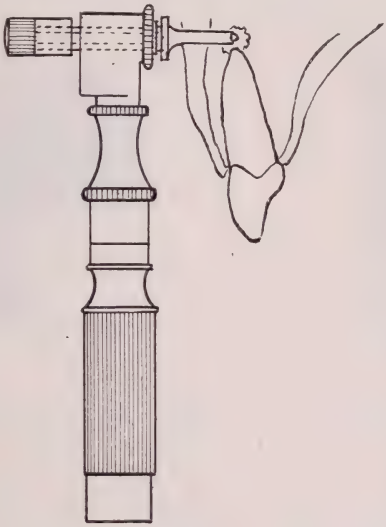
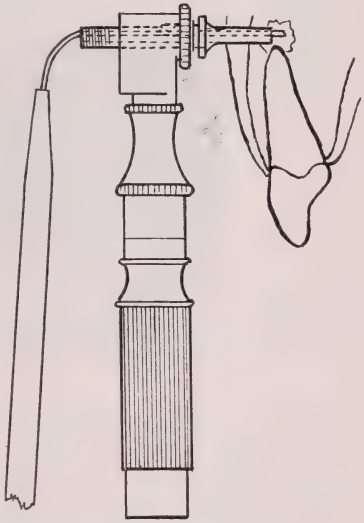
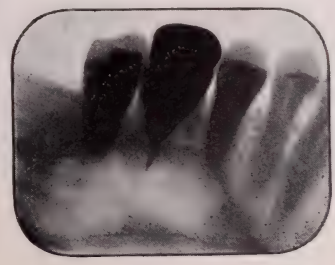


Fig. 6.



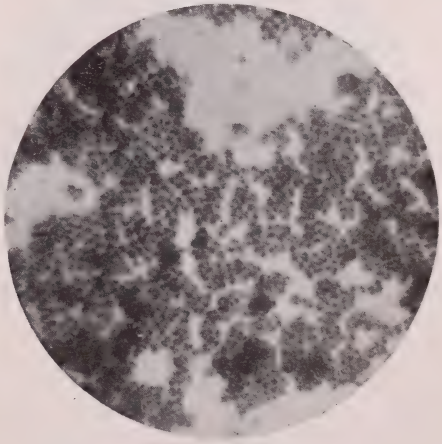
or trichloracetic acid, preferably the latter, the spot where the trocar is to be driven in. The trocar and handpiece having been thoroughly sterilized in a suitable dry-heat sterilizer, we drive the

Fig. 7.



trocar into the spot previously cauterized sufficiently deep to feel the point against the tooth structure. The engine is then stopped and the drill unscrewed from the trephine, leaving the trephine in the position to which it has been driven. We now take a platinum needle (having previously passed it through a Bunsen or alcohol flame three or four times) and pass it through the trephine and into the suspected area, then withdraw it and inoculate suitable culture

Fig. 8.

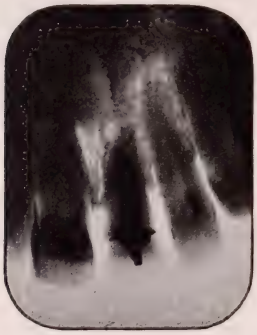


media with the culture thus obtained. I usually inoculate three different types of media, *i.e.* beef bouillon, glucose agar

(for the anaerobes), and blood agar for the hemolytic organisms, and stab each one, two or three times.

If the above technique is properly carried out, it is the only way I know of

Fig. 9.

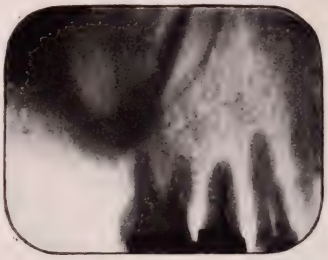


that it is possible to be certain that the growth obtained is free from contamination with other oral micro-organisms. The proof I have of this is that on numerous occasions I have obtained organ-

Fig. 10.

isms in pure culture from the originally inoculated tubes, without dilution or plating. Fig. 7 shows radiograph of molar from which the culture in photomicrograph Fig. 8 was taken. This slide was made direct from the first tube inoculated, without any plating (it shows staphylococcus aureus). Fig. 9 is a radiograph of a central incisor from which the culture shown in Fig. 10 was obtained. This is a mixed infection,

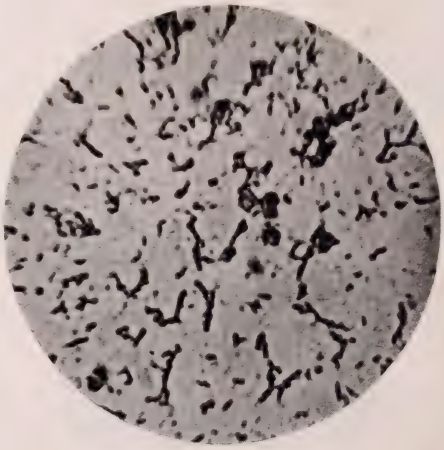
Fig. 11.



and was likewise obtained without plating or transplanting.

I have a number of these cases equally interesting, but simply submit these two as being typical.

Fig. 12.



In conclusion I will say that a good many cases where I have attempted to obtain growths from teeth that were infected (according to radiographic evidence) the results have been negative, and in a greater number of the teeth

where the radiographic evidence has been negative I have had luxuriant growths in from twenty-four to forty-eight hours. Fig. 11 is a radiograph of such a case, and Fig. 12 a very poor picture of a diplo-bacillus obtained from it. (This case was one of severe arthritis, and had a violent reaction after taking the culture, but finally showed a decided improvement after the tooth was extracted.)

The data that I have obtained in this way has convinced me more and more fully that the radiograph in a great many cases is worse than valueless, and unless we can back up our evidence with some definite method, such as the one described, any opinion that we may give regarding such cases is nothing more nor less than a guess. If we care to make a microscopic examination of the tissue involved, we can get our specimen from the flutes of the drill, and if we find tissue change, plus bacteria, we have disease.

516 Park ave.

The Use of the Drill as an Aid to Tooth Extraction.

By ISIDORE CLIFFORD, L.D.S., R.C.S.Eng., London, Eng.

I wish to make known to every member of the profession my experience in using drills before extracting teeth. It converts the present method of extraction (which is a combination of skill and brute force) into a simple scientific surgical operation. I have proved its success over and over again, and feel sure that every dentist will be thankful to know that he need never again struggle with an obstinate tooth.

Before extracting any tooth that I suspect may give the slightest trouble I drill away the labial or buccal plate of the alveolus, and then with a pair of forceps the tooth is easily removed through the opening thus made—without any chance of breaking it. My *modus operandi* is as follows: With a strong lancet I clear the gum from the tooth and alveolus, then take a large-size pointed cross-cut fissure bur from which the temper has been drawn (heating it to a dull red heat draws the temper and sterilizes it), and drill away the bone, keeping the bur close to the roots of the tooth. In the case of molars I make sure that the alveolus between the roots is carefully severed; about five-eighths of an inch is the usual depth to drill. It does not take half a minute to do this, though the temper of the drill has been drawn. (If the drill is hard it is liable to break.)

When I need to use an elevator, I drill a hole in the alveolus in exactly the position I want to place my elevator.

The most fragile or strongest tooth can now be extracted quite easily, as it makes no difference if the roots be curved or exostosed. This drilling is not necessary in any simple case, but I am sure every dentist will be delighted with the result of the drilling in every other case. There is far less bleeding than one would expect to find, and the removal of the alveolus is really an advantage, because it later has to be absorbed or exfoliated.

I feel I am doing a humanitarian act in giving this method the widest publicity.

20 Grosvenor st., W. 1.

Review of Current Dental Literature

[*Transactions of the American Laryngological Association.* (Thirty-ninth meeting, 1917.)]

Three Bronchoscopic Cases of "Dentists'" Origin. By B. R. Shurly.

As these three cases occurred during the last decade in a city of an average population during this time of 500,000 people, and as we have an estimated population of over 100,000,000, it might be fair to conclude that possibly six hundred cases of similar accident had occurred in the United States and Canada perhaps, during a similar period. In the discussion of Shurly's paper, mention was made of eleven similar cases.

Shurly believes that the probable frequency of this accident indicates that the possibilities of disaster in ordinary dental procedure were sufficiently great to inaugurate some preventive measures of additional safety. Two of his three cases (as that of Thomson) were not discovered by the dentist or patient at the time of operation. To avoid this, he suggests that some detailed method of observation and counting in the extraction of teeth be devised, similar to that provided by the abdominal surgeon in the case of sponges and instruments. Thomson supplements this with the observation that it would not entirely cover the field, as not only teeth on extraction are inspirated, but also crowns and bridges, burs, broaches, pieces of vulcanite and cements and plaster of Paris.

The line of action which a dentist should follow if he thinks, or even suspects, that a tooth or other object has entered the air passages, is indicated by the following seven "dont's" from Chevalier Jackson's work ("Peroral Endoscopy and Laryngeal Surgery," St. Louis, 1915, p. 235).

(1) Do not reach for the foreign body with the finger.

(2) Do not make any attempt at removal with the patient in any other than a recumbent position, with head and shoulders lower than the body.

(3) Do not hold up the patient by the heels, lest the foreign body be dislodged and asphyxiate the patient by becoming jammed in the glottis.

(4) Do not fail to have a radiograph taken.

(5) Do not fail endoscopically to search for a foreign body in all cases of doubt.

(6) Do not pass an esophageal bougie, probang, or other instrument blindly.

(7) Do not tell the patient he has no foreign body until after radiography, physical examination, indirect examination, and endoscopy have all proved negative.

To this list Thomson adds the injunction, The patient should *not* be encouraged to cough or hawk up.

In summary, the best the dentist can do in such an emergency or suspected emergency is to hand the patient over at the earliest moment to a skilled laryngologist.

[*Practitioner*, London, August 1918.]

Tooth Impacted in a Secondary Bronchus of the Left Lung; Removal by Lower Bronchoscopy. By St. Clair Thompson.

The patient was a girl of ten years. The tooth, a deciduous left mandibular first molar, was inspirated following the extraction of the tooth. Both patient and dentist were ignorant of this inspiration for the period of about one month. Respiratory and pulmonary symptoms had existed from the first. A radiograph revealed an opacity in the region of the root of the left lung, of rather indefinite outline, and roughly rectangular in shape.

Direct bronchoscopy, using a 7 mm. Bruening tube, under chloroform, through the mouth, five weeks after the accident, showed a white glistening tooth tightly impacted in an externo-lateral secondary branch of the left bronchus (it is decidedly rarer to en-

counter foreign bodies in the left lung than in the right) at a depth of 10½ in. from the teeth. All attempts at removing the tooth at this sitting failed.

A second peroral examination, eight days following the first, was a failure. The patient suddenly collapsed, and had to be restored by artificial respiration before an attempt at removal could be made.

The formation of a lung abscess forbade further delay. The third examination was in brief as follows: Under chloroform, tracheotomy was performed. This permitted the introduction of a 10 mm. Bruening tube. The tooth was found at a distance of 5½ in., and was relatively easily removed with a pair of Killian's "bean forceps." The after-history was uneventful. The scar on the neck is insignificant.

[*Paris Médical*, June 22, 1918.]

Maxillo-dental-facial Malformations. By Pierre Robin.

By maxillo-dental-facial malformations, Robin means all the irregularities of the teeth and of the jaws which distort the esthetic harmony of the face, as well as the form and volume of the cavities contained therein. These malformations are considered especially in their relation to diseases of the digestive and respiratory systems, of olfaction, of audition, as well as to the vicious attitudes of the thorax so frequently assumed in the case of children. The immediate consequences of these malformations are the imperfect preparation of the food bolus and of the inspired air.

It is imperative to correct these malformations as early as possible. Robin's method can be applied as soon as the eruption of the deciduous teeth is completed. His appliance, which is not technically described in this paper, acts not upon the teeth directly, but upon the jaw-bones themselves (the alveolar processes?), which thereby are slowly expanded. The appliance is inserted totally within the mouth, is worn all night, and as much as possible during the day; it is always removed when eating. The results are to Robin very satisfactory.

A priori, this appliance seems promising. The method meets the desideratum of Bogue (Dental Cosmos, February 1917, p. 246) of early treatment of malocclusion, which is only one item of Robin's maxillo-dental-facial malformations, even during the period of the deciduous teeth; apparently it is of simpler technique and of less annoyance to patients of such tender age; and finally, it is not impossible that moving a segment of the alveolar process with its teeth *in toto* is more logical than that of moving the teeth alone, as well as provocative of periodontal traumatism.

Robin's appliance appears to fulfil the conditions exacted by modern orthodontia. J. V. Mershon (Dental Cosmos, October 1918, p. 934) says "The ideal appliance is one which interferes the least with the normal functions of the tissues and organs of the mouth." The possibility of removing it whenever desired would permit the institution and inculcation of those exercises and habits so admirably presented by A. P. Rogers (Dental Cosmos, October 1918).

[*California State Journal of Medicine*, July 1918.]

Vincent's Angina: Report of a Case. By J. M. King.

The case is unusual for (1) its long course, the patient being seriously ill for about four months; (2) death from exhaustion, no special complication occurring (no autopsy was permitted); and (3) its resistance to neosalvarsan, three maximum doses being given a week apart without staying the progress of the disease. It is interesting to compare the symptoms and findings in this case, set forth below, with those enumerated by Barker and Miller (see pp. 1160–61).

The patient was a woman of twenty-six years; complained of sore-throat, fever, cough. Temperature 103°, cervical glands slightly swollen, whole pharynx covered with a slight membranous exudate, and on upper pole of right tonsil a small superficial ulceration. Smears showed abundance of Vincent's organisms (a condition persisting to time of death). Urine at first contained a small amount of albumin, a few hyaline and an occasional granular cast, but later was normal. At all times, leucocytosis of 12,000, of polymorphonuclear nature. The blood gave a weakly positive Wassermann. In course of observation the temperature was irregular, from normal to 104°. Pulse rose from 100 to 130 or so. Respiration mounted to 40. Anorexia

persisted. Vomiting was a rather marked feature. The local lesion before death had spread across the pharynx, involving the left tonsil, ate away the uvula, involved the soft palate, and invaded the larynx.

[*British Dental Journal*, June 15, 1918.]

A Case of Meningitis Associated with the Presence of Bacillus Fusiformis. By Cecil Worster-Drought.

In this case no definite primary focus beyond dental caries and pyorrhea alveolaris could be demonstrated even at autopsy. The patient was a man of thirty-two years. Apparently no microscopic examination was made of the "well-marked pyorrhea," which may or may not have been due to a Vincent's infection. This is unfortunate, as it would afford the first link in the chain connecting the "pyorrhea" with the meningitis. The spinal fluid showed numerous Gram-positive cocci, some lanceolate and in pairs, others in small chains, Gram-negative coliform bacilli, and many Gram-negative fusiform bacilli. No spirochetal forms were seen. There is nothing recorded in this report which would prove or disprove the implication that meningitis was secondary to an oral Vincent's infection.

[*El Siglo Médico*, Madrid, July 6, 1918.]

Facial Paralysis in a Syphilitic. By E. F. Sanz.

The patient, a man of forty-six years, had suffered for four years of hemiplegia with aphasia, from a cerebral syphilitic lesion. A series of injections of gray oil was given, five days after the first of which there appeared a paralysis of the left half of the face. Synchronously with this there was an exacerbation of the oral conditions, which were already in a bad state. The gums became turgid, dark red, with numerous ulcerations. Severe pain with tumefaction of the left upper jaw region was felt. The mouth was dry.

Sanz diagnosed the condition as a parotitis consecutive to mercurial stomatitis (*vide infra*, Barker and Miller's paper). The facial paralysis might on this assumption be attributed to a compression of the branches of the facial nerve by the inflamed parotid.

Mercurial medication was halted. A scrupulous disinfection of the mouth was instituted. Warm external applications were made in the region of the parotid. Very soon the stomatitis ameliorated. The inflammatory reaction of the parotid receded; step by step with this the facial paralysis became less marked, confirming Sanz' diagnosis.

[*Journal of Experimental Medicine*, October 1, 1918.]

Experimental Parotitis. By Martha Wollstein.

This work is summarized by the author as follows: A new series of inoculations of the filtered, sterile [free of microscopically visible organisms?] salivary secretions derived from cases of parotitis (including the epidemic parotitis of our military camps) has been described.

Confirmatory evidence of the filterable nature of the causative agent of mumps has been obtained. It has been determined that the saliva of man and of inoculated cats, and the inoculated glands of the latter animals, contain the filterable infective agent. The "virus" of parotitis was detected most readily in the saliva during the first three days of the disease, less easily on the sixth day, and not at all on the ninth day. It was detected also in the blood of patients showing marked constitutional symptoms, and in the saliva of a case of recurrent mumps at the periods of enlargement of the parotid glands, but not two weeks after the swelling had subsided. It was not detected in the cerebrospinal fluid.

[*Journal of the American Medical Association*, September 7, 1918.]

Perforating Ulcer of the Hard Palate Resembling Tertiary Syphilis, but Due to a Fuso-spirillary Invasion. By Lewellys F. Barker and Sydney R. Miller.

The patient was a man of forty-seven years, who presented himself on account of an ulcer on the roof of his mouth, of the development of which he had been conscious for only a few days, and which had gradually become larger and more painful. Physical examination revealed slight anisocoria, rather marked oral sepsis and gingivitis, an unpleasant, fetid odor of the breath, and a well-defined punched-out ulcer, about the size of a dime, situated on the hard palate, covered with a

thick, creamy, easily removed exudate, and surrounded by a deep red, somewhat indurated areola. The base of the ulcer bled easily. The clinical picture justified the suspicion of syphilis, but the Wassermann was negative. The patient was afebrile, and not sick. Smears showed the fusiform bacillus and the spirochetes of Vincent. The lesion promptly healed under treatment with dichloramin-T and local applications of concentrated arsphenamin solutions.

It is well known that the organic arsenicals are almost a specific for Vincent's infections. Consequently the rapid clearing-up of the lesion is to be ascribed rather to the arsphenamin than to the dichloramin-T, which in such cases at the Evans Dental Institute School of Dentistry, University of Pennsylvania, has proved unavailing.

This single case history has served the authors merely to introduce a concise and very well proportioned review of the subject. They recognize that it has been established without a doubt that one condition above all others exerts an influence favorable for the development of this type of ulcerative stomatitis, namely, oral sepsis, periodontal gingivitis, or pyorrhea. This fact has been pointed out by Bowman (DENTAL COSMOS, June 1918, p. 534).

The symptomatology is as follows. Objectively one notes—

(1) Insignificance, as a rule, of constitutional disturbances; the patient is not very ill. (For possible exceptions, see reports of cases by Worster-Drought, King, and Sanz on pp. 1059-60.)

(2) Absence of fever, rarely over 100–101°.

(3) Heavy and offensive breath.

(4) Enlargement of the cervical and submaxillary glands, as a rule moderately; they are tender and never suppurate.

(5) The lesions proper.

(6) Swollen, spongy and bleeding gums, suggestive of scurvy.

Subjectively the patient complains of—

(1) Extremely bad taste in mouth.

(2) Tenderness of the gums, so that the use of a toothbrush is impossible, and mastication is so painful as to preclude eating.

(3) Pain in swallowing.

(4) Looseness of the teeth, with salivation, which is common resembling mercurial ptyalism (*vide infra*, laboratory finding No. 2).

(5) Anorexia.

(6) Joint pains, frequently.

(7) Lassitude—lack of "go."

(8) The most serious constitutional symptom, and one always present when the teeth and gums are affected, is severe depression.

The laboratory findings are—

(1) Uniformly negative blood cultures.

(2) The Wassermann in all cases of Vincent's disease is negative in nonsyphilitic patients. The presence of a positive reaction does not exclude Vincent's disease, and experience has shown that patients with a syphilitic history, undergoing mercurial treatment, are especially prone to this form of mouth lesion. (In other words, "mercurial" stomatitis is strictly a Vincent's infection of the gingival tissues, whose resistance has been lowered by the specific treatment.) *Cf.* Sanz' report [opposite page].) It is acknowledged that the treament with mercury can be pushed to a far greater extent in cases with healthy mouths than in those with mouths filthy with oral sepsis. This is explicable on the views of Bowman and of Barker and Miller themselves, viz, that oral sepsis strongly favors Vincent's infection. The question of the Wassermann reaction in Vincent's infection has received some attention, and the view held by the authors is that advocated by Taylor and McKinstry (DENTAL COSMOS, May 1918, p. 449).

(3) The leucocytes are rarely increased over 10,000; anemia does not develop in the majority of cases.

(4) A transient albuminuria is common in the more severe cases.

(5) Smears from the lesions show the characteristic organisms, a fusiform bacillus and a coarse spirochete, in association with numerous other organisms.

(6) Dark-field illumination aids greatly in eliminating the treponema pallidum.

As the identity of the two organisms mentioned above in (5) is undecided, and since the postulates of Koch have in no sense been fulfilled, the crucial demonstration that these organisms are the specific cause of Vincent's disease is at present lacking. This much is known—

(1) In all of the lesions under discussion the organisms are present, as a rule, in enormous numbers, and often virtually in pure

culture. The severer the infection, the greater the number of organisms.

(2) There is positive evidence both as to the infectiousness and contagiousness of Vincent's disease.

(3) Healing of the lesions goes on parallel with the disappearance of the organisms. When complete, no organisms remain.

These facts may be taken as adequate proof that if the organisms are not the only, they are certainly an essential factor in the causation of these lesions, which constitute a clinical picture distinctive enough to be considered an entity, and so regarded by the consensus of present opinion.

Two sentences are of particular interest to the dentist. The first injunction, under the heading of Treatment, is: "A good dentist is one of the best therapeutic measures; the care of the mouth is essential." And the admonition which receives the emphatic position of concluding the article is: "Prophylaxis is better than cure; oral sepsis is inexcusable."

[*Bulletin of the Johns Hopkins Hospital*, October 1918.]

Multiple Primary Malignant Tumors. By R. H. Major.

The single case upon which this extensive analysis of 196 similar cases throughout the literature is based, concerned a woman of sixty years, who was suffering from carcinoma involving the right side of the nose, and extending to the inner canthus of the right eye. Necropsy showed an unsuspected round-celled sarcoma of the stomach.

Periscope

Relieving Pain of Devitalized Pulp.—When a patient returns to the office with an aching tooth as the result of a treatment for devitalization, conduction anesthesia may be used with good results. If properly performed the aching subsides in a few minutes, after which the tooth may be thoroughly and painlessly opened up. A new treatment can then be placed in the tooth, or if sufficient anesthesia is present, the pulp can be removed at once. In either instance, a patient relieved of pain will leave the office.—Albert E. Converse, *Dental Review.*

Instructions in Re-sterilizing Compound.—(1) Thoroughly clean all plaster from compound, breaking any extra large pieces of compound so that there are no pieces larger than an egg.

(2) Place in a pot—a double boiler is preferable, as it prevents the compound from burning at the bottom—and cover well with a solution of glycerite of naphthol (benetol) composed of one ounce to one gallon of hot water.

(3) Bring to a boil as rapidly as possible and boil thirty minutes. *Note:* Be sure the water is really boiling, as the small pieces of plaster left in the compound will cause numerous bubbles to rise.

(4) Pour the water off and pour out the compound, which should be a spongy mass, on a sheet of galvanized iron or clean planed board, previously covered with Russian oil.

(5) Knead thoroughly the same as dough, when the plaster that may have been left in will work to the surface in the form of a bubble. Be sure to keep the hands well covered with Russian oil to prevent the compound from sticking, and start kneading as soon as it can be handled. Do not use soap and water to prevent the compound from sticking, as the lye in the soap will destroy the oils in the compound.

(6) As soon as the compound begins to show signs of stiffening, roll out on an oiled surface, and just before hardening run a knife across the same, marking off squares of desired size.

An excess of Russian oil incorporated in the compound will seriously retard its setting qualities. An excess of oil may be extracted by again bringing the compound to a boil. Only enough oil should be used to keep the compound from sticking to the table and hands.—W. E. Cummer. *Oral Health.*

Removing Bad Lateral Root.—An upper lateral root which the X-ray showed to be infected as well as crooked, absolutely resisted all usual methods of removal.

At a hardware store a very small "machine screw tap" was purchased, also one or two short machine screws to fit the thread which this screw would cut. With a large fissure bur the canal was carefully enlarged, and a real screw-thread carefully cut in the sound dentin of the tooth. The tap was then removed, and one of the machine screws firmly set up tight in this threaded root. The protruding head of the screw offered a splendid hold for the ordinary forceps, and the root came out entire and without fracture.—ARTHUR G. SMITH, *Dental Review.*

Removing Plaster from Vulcanite Dentures.—The dental laboratory worker sometimes finds, on removing a plate from the flask after vulcanization, that the mold or model plaster has formed a hard and strongly adherent layer of crystals on the surface of the vulcanite. Prevention is, of course, better than cure, and one ought not to be so careless as to leave the flask in water for some hours after vulcanization. In cases where one can afford to wait for the gradual action of a slow solvent, the following method will be found very satisfactory: The well-washed plate should be immersed in a strong or saturated solution of sodium hyposulfite—photographers' "hypo"—and left in this solution overnight. On removal from the solution, it will be found that in many instances the incrustation has been entirely dissolved. Should some crystals remain on the plate, they no longer adhere closely, and they can be readily brushed away, leaving the vulcanite surface quite clean.—*Oral Health.*

How to Fit and Apply Angle's Ribbon Arch.—All bands are to be fitted and soldered at the chair. Make anchor bands out of coin gold, 32-gage, soldering buccal tubes thereto. A more accurate fit can be obtained by following this procedure than by using ready-made bands. Place anchor and bracket bands on the teeth, and take a plaster impression. Put on two coats of shellac and one of sandarac varnish, let the impression stand over night, then run a model in Weinstein's artificial stone.

Place one end of the ribbon arch in the buccal tube, and by careful annealing and bending it can be sprung to place in each bracket. Remove from the brackets and place the other end of arch in the buccal tube. Loosen up the nuts and anneal with blowpipe. Iron-bending wire should be used to hold the arch in the brackets, for the reason that it will not sweat the parts together. The ribbon arch treated in this way will fit perfectly, and will not put a strain upon any part until manipulated by the operator.—J. BERTRAM STEVENS, *Internat. Journ. of Orthodontia.*

Matrices for Amalgam Fillings.—In my opinion the method of fastening matrices with a ligature is sloppy and uncertain. The ligature is liable to slip off and give way. Besides, the 36-gage copper advocated is unnecessarily thick. A better way is to use a soldered steel matrix, which can be made of thinner material and is secure, as well as quickly and easily made. You can make up a stock of them of all sizes you may need, as follows: Get one of the stands used for holding seamless caps, which consists of an oblong flat piece of wood with numbered upright cylindrical blocks. Get a sheet of the thinnest matrix steel. The S. S. White Co. has it of a thinness almost of writing paper. Cut the steel into strips of convenient length, pinch around the blocks, remove, hold the pinched portion in appropriate pliers, flux the joint with solution of zinc chlorid made by dropping a piece of zinc into hydrochloric acid, apply a small piece of soft solder, and solder over alcohol lamp. Do not trim the soldered portion flush, but leave quite a little projection to give plenty of strength. You will, after a short experience, be able to pick a matrix which will fit or approximately fit the tooth you are working on. If the one you selected does not fit the tooth, find which of the cylindrical blocks it does fit. From that you can determine the exact size you want. You can then trim it if necessary to avoid irritation of the gum; place on the tooth, shape the end of a stick of orange-wood to fit between the teeth, and hold the cervical part of the matrix against the gingival wall, preventing overhang of filling. Do not cut your orange-wood wedge to interfere with contour. With the wedge in place, you are ready, after drying, etc., to fill. You will need about twelve sizes. Of those about six are most frequently used. You may rarely need a size larger than the largest of the blocks, which of course is easily made. It may sometimes be necessary to cut the matrix before removing after hardening of the filling. Generally I am able to remove without cutting after the filling has been left to harden sufficiently.

The matrix can then be washed, sterilized in flame or boiling water, and used several times.—VINCENT FISCHER, *Dental Review.*

"The Psychology of the Child" is something that should be incorporated in a progressive school of orthodontia, inasmuch as we are dealing with children at ages when they are most impressionable. Further, we are working under a nervous strain, and we may so arrange our surroundings, our office fixtures, the decorative scheme, etc., as not to be conducive to relaxation, and this reacts not only on ourselves but on those coming into the office. Every person entering a professional or business office is impressed favorably or unfavorably, irritated or rested, by the surroundings. Personally, if I go into a room in which the pictures are hung on the wall at an angle or placed in an inappropriate location, I do not rest very comfortably. Those things are affecting us at all times, and if we ourselves are irritated those whom we serve will be unconsciously affected in a similar way. I believe certain malocclusions are produced by a child's surroundings, inasmuch as they show similarity in voice, features, and various expressions of those whom they admire. I believe certain class III cases are produced through the imitation of the child, through the fondness of the child for a grandparent or parent in whom this type of malocclusion was present.—WM. CAVANAUGH, *Pacific Dental Gazette.*

A Plaster Bite for Bridge Work.—In constructing bridge work, it is often difficult to transfer crowns or attachments from the abutment teeth to a working model with certainty as to maintaining their proper position and relation throughout the procedure. For small or moderate-sized bridges, a plaster bite, taken as follows, will be found efficient and reliable for this purpose:

With the crowns or attachments securely and accurately in position upon the abutment teeth, mix plaster moderately stiff, and with a suitable spatula apply generously over the abutments and surrounding tissues which are necessary to be reproduced in the model, and have the patient bite the opposing teeth to place.

When the plaster has set, remove the bite, and replace the attachments in the impression. If the attachments pull off in the bite, be sure to press them firmly back into position, and secure with hard wax before running the model. In some cases it may be necessary to split the plaster to remove the bite, but this is generally of little consequence, as the plaster can easily be pieced together with hard wax.

The advantages of this method are certainty of maintaining proper position and relation of attachments, and at the same time obtaining an accurate impression of the opposing teeth.

If that portion of the bite which contains the impression of the opposing teeth is run up in some hard model material such as Weinstein's artificial stone or Spence compound it will be an advantage, for when plaster is used, this portion of the model is often rendered useless by abrasion or breakage.—C. W. COLTRIN, *Dental Review.*

The Inlay Abutment.—This attachment is indicated for both the anterior and posterior part of the mouth, and is especially designed for short bridges, but at times can be used for longer ones. In the posterior teeth, the inlays are placed in the occlusal approximal surface, and in the anterior teeth on the lingual side approximating the space to be bridged. The tooth is prepared for the inlay and a tube of suitable size is dropped to the floor of the pulp chamber, and a little distance into the enlarged canal. The cavity is then filled with inlay wax, running it well around the tube, and carving to restore the normal contour of the tooth. The whole is then removed, the tube filled with asbestos paper or fiber, after which it is flasked and cast. It is then cleansed, placed in the mouth, and articulated. The impression is taken with the inlay in place, and after removing the impression from the mouth the inlay is waxed in it and the model prepared. The work from this point on is done on the model. We are now ready to prepare the second inlay.

The cavity is ground in the first inlay, following the general shape of the tooth cavity, leaving a thick enough margin of gold all around to give strength to the inlay. It is then smoothed and polished. The entrance to the tube is slightly enlarged, a split pin is fitted in it and bent at right angles to the tube, the extending surplus metal resting in the groove. The second inlay can now be made by waxing carefully, removing, and casting around the pin. Another method which the writer prefers is to fit a pure gold matrix into the cavity of the first inlay. The pin is passed through the bottom of this matrix and into the tube. It is then waxed carefully with hard sticky-wax, removed, invested, and filled with coin gold, after which it is cleansed, replaced in the original inlay, and finished. The bridge is soldered to the inlay.

This technique of inlays as abutments is not at all dependent on the casting process. The casting process is of very little service when applied to removable work where great accuracy is essential.—F. A. PEESO, *Journ. N. D. A.*

Obituary

Major Harold W. Estey, D.D.S.

Died, in France, Monday, October 28, 1918, of pneumonia, Major Harold W. Estey, D.D.S.

Major Estey was a well-known Boston dentist, who was graduated from Harvard Dental School in 1897, and had practiced his profession in Boston for a number of years. Major Estey's military service began in 1897 as a private in the Reserve Corps Cadets, in which organization he became captain of Company A. Soon after the declaration of war Major Estey was detailed for service in France, being promoted to the rank of major. Soon after his arrival in France he was detailed to a French staff war college, and after completing the course of instruction, was regulating and liaison officer connected with the general staff. In April 1918 he was decorated by the French government for extreme bravery under fire.

Major Estey is survived by his widow, three young sons, three sisters, and a brother.

Dr. William Henry Wright.

Died, at his home, Brandon, Vt., May 11, 1918, in his seventy-fifth year, of heart trouble, Dr. William Henry Wright.

Dr. Wright was born in Shoreham, Vt., August 25, 1843. He obtained his early education in the district school of Whiting, Vt., and Brandon Seminary. He studied dentistry under a preceptor in Middlebury, Vt., and in February 1865 opened an office for the practice of dentistry at Brandon, Vt., where he continued in active practice for forty-eight years.

Dr. Wright was long and favorably known in the dental circles of Vermont, being a member of the Rutland County Dental Society and a member of the Vermont State Dental Society, serving the latter society as president in 1894. Although actively engaged in the practice of his profession, Dr. Wright was largely interested in farming, real estate, and politics. He was one of the founders of the Cloud County Bank of Concordia, Kansas, and had served in the capacities of vice-president and president of this bank for twenty-five years. He was also president of the First National Bank of Brandon, Vt., for more than fifteen years. He was a member of the House of Representatives from 1912–14, and was a member of the Vermont State Senate in 1915–16.

Dr. Wright was married to Miss Alma Esther Smith of Brandon, Vt., in 1873, and is survived by his widow and two sons.

"In Memoriam" Resolutions.

Dr. Robert M. Scott.

At the regular meeting of the Dental Society of Chester and Delaware Counties (Pa.), held September 25, 1918, the following *in memoriam* resolutions were adopted.

Whereas, in the providence of an all-wise Creator, our fellow member Dr. Robert M. Scott died June 29, 1918; and

Whereas, his ability and skill as a practitioner and his keen interest in professional affairs placed him in the front rank among the members of this society; now therefore be it

Resolved, That we, the members of this society, feel deeply his loss, and hereby express our appreciation of his worth, and our sorrow over the untimely close of a successful career: and be it further

Resolved, That a page on our minute-book be set aside, and the secretary be instructed to inscribe thereon these resolutions, and that a copy be sent to his widow, also to the professional journals for publication.

Justin E. Harlan,
A. Herbert Grubb,
David Y. Sahler,
Committee.

Army and Navy Dental News

Camp Fremont Dental Corps Notes.

By Raoul H. Blanquie, 1st Lt. D. C., Camp Fremont, Cal.

The 8th Division at Camp Fremont, Cal., was one of the last cantonments to receive its full quota of dental surgeons. For several months the entire amount of dental work was handled, as best could be, by a few army dentists. The actual commencement of the dental corps was marked by the assignment to this division of Major C. M. Taylor, D.C., as acting division dental surgeon last April. A U. S. army division comprises 27,500 men, and is entitled by table of organization to 31 dental surgeons, and as many dental assistants.

In May dental officers began reporting for duty, and then started the division dental surgeon's task of organizing the corps. Upon arrival in camp each dental surgeon was placed on attached service to a definite organization and made attendant to approximately 1000 men. A complete field dental equipment was furnished him, which was set up in a room in the infirmary of his organization, or if this was not available, a special tent was placed at his disposal. In order to expedite the work in a systematic way, each dental surgeon undertook a survey of his organization, giving every man a complete examination and recording on a chart the necessary work to be performed. Later, those requiring immediate attention were treated first. The following compiled data will give an idea of the amount of work confronting the dental corps at this camp.

Records for 14,339 men were obtained. The division consists of 27,500 men. Therefore, this left 13,161 yet to be tabulated.

Number of carious teeth	21,402
" " extractions	6,053
Abscessed teeth and those with putrescent pulps	2,295
Pyorrhea, true	679
Extensive salivary deposits	873

Number of impacted 3d molars not tabulated; one dental surgeon of the 320th Field Sig. Bn. found 13 upon examination of 800 men.

No tabulation of number of dentures needed.

In June the permanent "division dental infirmaries," consisting of two large buildings, were completed and occupied. It may be said that these buildings are the best constructed in this camp. They are roomy, well lighted and ventilated, and furnished with hot and cold running water. The hours of duty are as follows: 7.45 A.M. to 12 M. 1 P.M. to 4 P.M. 4 to 5 P.M., exercises and drill.

The corps during July has had its numbers depleted, owing to transfer of some of its members. Nevertheless, work has been progressing substantially, as can be judged by the record of the month of July, viz:

Dental surgeons working	28
Total number of persons treated	2,301
" " " sittings given	5,282
Sundays and holidays, total days	9½
Actual hours worked	165

Diseases.

Abrasion	2
Abscess of jaw, with impacted teeth	14
Defective fillings	123
Dental caries	5,545
Dento-alveolar abscess	685
Devitalized pulps	303
Erosion	16
Erupting teeth, painful	16
Empyema of the antrum	2
Fracture of the jaws	1
" " " teeth	25
Gingivitis, simple	95
" ulcerative	5
Hemorrhage, post-operative	17
Hypertrophy of the gums	11
" " " pulp	5
Impacted teeth	20
Irregularities of the teeth	4
Necrosis of the jaws	1
" " " teeth	56
Neuralgia, facial	2
Pericementitis, acute	17
" chronic	5
Periosteitis, acute	1
Pulpitis, "	263
" chronic	98
Pyorrhea	132
Salivary deposits	429
Sensitive dentin	125
Stomatitis, acute catarrhal	2
" aphthous	1
Odontalgia	3
Wounds of the mouth, contused	4
Stomatitis, ulcerative	1
Exposed pulps	56
Putrescent pulps	248
Infected sockets	2
Moist pulp gangrene	4
Vincent's angina	9
Epulis	1
Tooth, superimposed	1
Granuloma	1
Syphilis	3

Operations.

Sensitive dentin, Ag-NO_3 treatment	11
Polished fillings	43
Crown facings repaired	2
Conduction anesthesia	25
Tooth separation	1
Pulps capped	24
As_2O_3 treatments	17
Gums lanced	18
Pyorrhea treated	46
Porcelain crown	1
Grinding and fitting crown to root	2
Gold shell crowns	1
Gold inlays reset	10
Amalgam crown restorations	21
Crowns removed	1
" reset	24
" repaired	1
Bridges reset	10
" repaired	3
Impressions for crown	1
" " inlay	2
Teeth treated	889
Total number of fillings finished	4,833
Salivary deposits removed	942
Post-operative cleansing	147
Abscesses lanced	23
Pressure anesthesia	6
Pulps devitalized	43
X-rays ordered made	34
Pulps extirpated	177
Gums treated	64
Apicoectomy	1
Fillings mended	5
Bridge removed	1
Orthodontia appliances removed	1
Occlusion relieved	10
Fracture cases treated	17
Antrum " "	16
Partial upper impressions taken	12
" lower " "	11
Full upper " "	1
Partial upper dentures inserted	9
" lower " "	15
Full upper " "	1
Repairs to denture	1

Twice weekly, meetings are held under the direction of Major Taylor, after regular hours. Regulations of the service and the court-martial manual were at first taken up at length. Papers are read and discussed, each dental surgeon preparing a paper on a subject relative to oral surgery or army dentistry, and one being read at each meeting.

The base hospital of this division carries two dental surgeons. These men are constantly in consultation with the medical staff in cases of patients suffering with systemic disturbances from focal infections, and are rendering a great assistance in clearing up these cases. Here is also established a well-equipped dental laboratory where a great number of partial dentures with lingual bars, and full dentures, are made for those in need of them in the division.

All credit for the work accomplished is due to Major C. M. Taylor, who has

endeavored assiduously to make the dental corps at Camp Fremont a smooth-running and efficient organization.

It is the hope and desire of each member in this corps to see active service overseas very soon.

Italy Honors General Gorgas.

In recognition of his distinguished services in behalf of military sanitation, Major-general William C. Gorgas, until recently Surgeon-general of the United States Army, has been made a Grand Officer of the Order of the Crown of Italy. The ceremony of presentation took place November 5th, in the office of the Surgeon-general, the order being presented by Major General Emilio Guglielmotti, military attaché of the Royal Italian embassy.—*Army and Navy Register.*

Sources of New Dental Officers.

Decision was reached this week by the military authorities, upon recommendation of Col. William H. G. Logan, medical corps, head of the dental section of the Surgeon-general's office, in regard to the methods to be followed in obtaining the additional dental officers needed as a result of the recent increase in the military forces. By orders recently issued the allowance of dental officers was increased to one for every 500 men in the United States, three for each camp hospital, and three per thousand for each general hospital, and the allowance for the forces overseas also was increased, the new allowance amounting approximately to one for every 500 of the total strength of the army. Under the new schedule, a total of some 10,000 dental officers will be needed by July 1, 1919, or about 3500 more than now are on active duty and temporarily commissioned in the dental corps and still on an inactive status. The regulations that will govern new appointments are based on the premises that those dentists that are in, or will be taken as a result of the draft into, the military service should first be given opportunity to qualify for commissions in the dental corps. Therefore opportunity for commissions will be confined to those dentists that now are serving in the enlisted grades, and to those that may come in through the draft. If the vacancies are not all filled from these classes, then dentists within the draft ages and rated in class 1-A and not called to service, and those between forty-six and fifty-five years of age, will be given the opportunity to take examination for appointment. There are now about seventy vacancies in the dental corps of the regular army. Candidates, who will be limited generally to those now temporarily in the service, will be examined, commencing November 4th, by boards that have been ordered to meet at Fort Slocum, N. Y.; Camp Meade, Md.; Fort Oglethorpe, Ga.; Camp Lee, Va.; Columbus Barracks, Ohio; Fort Sam Houston, Texas; Camp Funston, Kans.; and Letterman General Hospital, San Francisco.—*Army and Navy Register.*

Naval Dental Corps.

Progress is being made in the naval dental school, recently established at the naval training station, Great Lakes, where about thirty young dental officers are under instruction. The first course will be completed in a week or two, and another class will be formed. The courses are six weeks in length, and consist of both naval and professional subjects, the purpose being to prepare newly appointed dental officers for their duties afloat and ashore in the navy. The dental corps of the navy now consists of about 500.—*Army and Navy Register.*

Army Medical Department.

Changes in the duties of the officers of the army medical department in the important billets in this country, expected as a result of the appointment of General Ireland as Surgeon-general of the Army, are destined to be made with great deliberation, if made at all to any extent. General Ireland proposes to proceed without violence in his administration of the affairs of the department, and so far only the necessary orders are being issued. The most important of the week is the assignment of Col. Winford Smith, formerly superintendent of the Johns Hopkins Hospital, as head of the hospital division of the Surgeon-general's office, as the successor of General Noble, who has gone to France. General Ireland has been succeeded as chief surgeon of the American Expeditionary Force by Col. Walter D. McCaw, it has been announced. It is not made known to what duty General Noble will be assigned.—*Army and Navy Register.*

Promotions.

ARMY DENTAL CORPS.

The following appointments (promotions) are announced (October 19th):

To be Captains—for existing emergency: 1st Lieuts. Julius D. Goldman, George M. Frith, Richard C. Hughes, Vincent A. Hannigan, Edward B. Riblet, Wm. E. Mentzer, Aaron R. Crane, Frank M. McFarland, Floyd E. Clinite, Charles T. Miles, John E. O'Flinn, Atwell L. Benton, Harry V. Talbert, John A.

Zwisler, Wm. P. Higgins, Ross O. Dickson, Charles B. Amis, Robert E. Giddens, Frank Vaughan, Henry H. Facteau, Benjamin F. Pound, and Andrew I. Denney.

Announced October 26th:

To be MAJORS—for existing emergency: Captains Frederick L. Litty, David A. Proctor, Wm. F. Blair, John F. Connolly, Clyde E. Duncan, Idus W. Shields, Earle Robbins, John J. Collins, and Kyle B. Alsobrook.

Announced November 2d:

To be CAPTAINS—for existing emergency: 1st Lieuts. Jacob L. Brause and Clifford Strange.

Announced November 9th:

To be CAPTAINS—for existing emergency: 1st Lieuts. Wm. S. Carrick, Ralph L. Faulkner, Charles W. Marriott, and John C. Zeidler.

Assignments.

Week ending November 9th.

The following to Fort Oglethorpe, Ga., for instruction: Majors Oscar G. Skelton, Emmett P. Varvel, Walter L. Reesman, and Harry M. Deiber.

Preparedness League of American Dentists.

ORGANIZED UNDER THE AUSPICES OF THE N. D. A.

Preparedness League Notes and News.

By R. OTTOLENGUI, *Publicity Committee.*

FROM THE PRESIDENT.

AMERICA is to be the greatest nation of the world. Why? Because we are giving freely to help the rest of the world. Without the untold sacrifices we have made and the billions upon billions we have laid on the altar of humanity, we could not become great. Have we done this in a spirit of selfishness? No! We have done it without thought of reward. We are exemplifying our conception of the Golden Rule.

Do you think the millions of women working patiently month after month for the greatest organization in the world . . . the American Red Cross . . . are looking for personal benefit? Do you think that body of self-sacrificing girls and women who never think of themselves . . . our noble nurses . . . are looking for self-aggrandizement as reward for their labor of love?

Let us not debase our own thoughts by permitting even a suggestion of such things. YOU know it is not possible.

Where, then, does each one of us stand in relation to the world's work that is before us? Each one knows just how much he has done and what motives prompted him in doing it. This is a matter unto himself. But no matter how much we have done, we must do more. The only limit is our physical capacity.

The October number of the *Literary Digest* prints an article entitled "Europe Admiring Yankee Teeth." The teeth of our boys have been an object of admiration by the other armies, and the article makes special mention of the splendid services of American dentists. This is encouraging to us and indicates that our efforts are appreciated, and should prompt us to do more than ever to send our boys away in as good condition as possible.

Do you know that when our boys have toothache while in the trenches, their teeth are extracted and they are sent back immediately? It does not matter if it is a front tooth that is aching—it must go, even though it could be treated and filled. When those boys return to civil life, they will be badly handicapped. We must avoid such a situation as far as possible by doing our duty by them before they leave their home town for camp. This is the duty of the League.

In a recent letter from a member of the dental corps now in France, he says: "The League is not forgotten over here. I have met many of our soldiers who had their teeth fixed by its members, and they are very grateful. I have met others who did not take advantage of the opportunity, and they are very sorry." The work you do for them is fully appreciated when they are "over there." Let us spare no effort to help our boys.

STUDY CLASS IN POST-WAR DENTAL WORK.

A course of practical instruction in the most recent and approved methods of war oral surgery has been arranged by the Royal

College of Dental Surgeons, Toronto, Canada, and the Preparedness League of American Dentists, during the week of December 16–21, 1918. That it may be international in character, instructors of unquestioned ability from the United States as well as Canada will collaborate in the object of giving American dentists the benefits of such knowledge in oral surgery as has been gleaned from actual experience at the front.

Canada now commands a large amount of clinical material, which is constantly being augmented by the many wounded soldiers being returned from overseas. The teaching and laboratory facilities of the Royal College of Dental Surgeons have been given over to this object, and the operative clinics will be given in Toronto Hospitals. The number will be limited to one hundred, which will be divided into classes of twenty-five each, thereby insuring the personal attention of the instructors for each member.

Col. W. H. Thompson, in command of the dental corps of Ontario, has extended the privileges of the numerous military clinics and the full assistance and co-operation of the military for the purpose of making this course most practical in character. Major E. W. Cummer will instruct in prosthesis and Col. G. G. Hume, who has returned from three years' service overseas, will have much of practical value to impart.

This is an exceptional opportunity, and members of the League should take advantage of it. A fee of fifty dollars will be charged, which goes to the instructors.

Announcement will later be made relative to carrying on this course in the principal cities of the United States.

J. W. Beach, *President.*

American Red Cross.

Demonstration in dental clinic at St. Etienne.

SPECIAL NOTICE.

Rescinding of "Platinum — Iridium — Palladium" Regulations.

WAR INDUSTRIES BOARD, WASHINGTON, D. C.

[WE are authorized to publish the following official order rescinding the regulations governing the sale, possession and use of "platinum, iridium and palladium or compounds thereof" as published in our previous issue.—ED.]

(I.)

The following Order was issued November 14, 1918:

Because no longer required for the public safety, the Director of the Bureau of Mines, in charge of Explosives Regulation, has made the following changes in the General Information and Rulings under the Act of October 6, 1917 (40 Stat. 385) and as amended by the Sundry Civil Act of July 1, 1918.

1. All regulations relating to ingredients not used or intended to be used in the manufacture of explosives are revoked and no further license of such ingredients will be required.

2. All regulations relating to fireworks are revoked and no further license of fireworks will be required.

3. All regulations relating to Platinum, Iridium and Palladium, and compounds thereof, are revoked and no further license for Platinum, Iridium and Palladium will be required.

Approved:
VAN H. MANNING,
Director.
FRANKLIN K. LANE,
Secretary of the Interior.

CLARENCE HALL,
Chief Explosives Engineer.

(II.)

The effect of the foregoing Order is to render void any licenses heretofore issued to you under the so-called Platinum Rules and Regulations, dated August 17, 1918; to render unnecessary further compliance with said Rules and Regulations, and to terminate the necessity for securing further licenses thereunder.

(III.)

The foregoing Order shall not operate to relieve any person upon whom an order requisitioning Platinum, Iridium and Palladium, or compounds thereof, may have been served, from any obligation imposed upon him by such order.

PLATINUM SECTION:
C. H. CONNER, *Chief.*

SOCIETY NOTES AND ANNOUNCEMENTS

NOTICES should reach the Office of the DENTAL COSMOS not later than the 11th or 12th of the month preceding that of publication.

American Institute of Dental Teachers.

THE next annual meeting of the American Institute of Dental Teachers will be held at Hotel Piedmont, Atlanta, Ga., January 28, 29, and 30, 1919.

Papers on the teaching of war dentistry and an exhibit of war appliances will be the main features, and along with these will be the usual papers on teaching methods. All persons interested are cordially invited.

ABRAM HOFFMAN, *Sec'y*,
381 Linwood ave., Buffalo. N. Y.

Dental Protective Association.

THE annual meeting of the Dental Protective Association of the United States will be held at the Palmer House, State and Monroe sts., Chicago, on December 16th, at 4 P.M. Reports of officers will be presented, a board of directors elected, and such other business transacted as should come before the association. All members are urgently requested to be present.

J. G. REID, *President*.
J. P. BUCKLEY, *V.-pres. and Sec'y*.
D. M. GALLIE, *Treasurer*.

Ohio State Dental Society.

THE fifty-third annual meeting of the Ohio State Dental Society will be held in the Memorial Hall, Columbus, December 3, 4, and 5, 1918.

An excellent program of papers and clinics is assured, with some new features of special interest.

A cordial invitation is extended to members in good standing of other state societies to meet with us.

F. R. CHAPMAN, *Sec'y*,
305 Schultz Bldg., Columbus, Ohio.

California Board of Examiners.

THE next meeting of the Board of Dental Examiners for the purpose of examining applicants for a license to practice dentistry in the State of California will be held in the city of San Francisco at the Dental College, University of California, beginning on December 9, 1918. All applications for examination must be filed with the board on December 9th at 9 A.M. Each application must be accompanied by (1) the fee of $25; (2) diploma and license from other states; (3) diploma from an accredited high school giving a four-year course of instruction or a certificate signed by a state superintendent of public instruction (or similar officer) to the effect that such applicant has had scholastic preparation in all respects equivalent to that demanded for graduation from an accredited high school giving a four-year course of instruction, in the state from which such certificate is issued; in lieu of such high-school diploma or certificate, an applicant who has been licensed in some other state of the United States for a period of at least five years may file his state license; (4) a testimonial of good moral character; (5) a recent unmounted photograph.

By order of the Board of Dental Examiners of California.

C. A. HERRICK, *Sec'y*,
133 Geary st., San Francisco, Cal.

Montana Board of Examiners.

OWING to the present war conditions and the lack of a sufficient number of applicants, the Montana Board of Dental Examiners will *not* hold the usual January examinations. The next examinations will be held at Helena, Mont., on July 14, 15, 16, and 17, 1919.

T. M. HAMPTON, *Sec'y*,
Helena, Mont.

North Carolina Board of Examiners.

THE next meeting of the North Carolina State Board of Dental Examiners will be held at Raleigh, N. C., beginning promptly at 9 o'clock on Thursday morning, January 9, 1919.

For further information and application blanks address

F. L. HUNT, *Sec'y*,
Asheville, N. C.

Pennsylvania Board of Examiners.

THE next examination of the Pennsylvania Board of Dental Examiners will be held in Philadelphia and Pittsburgh, on Tuesday, Wednesday, Thursday, and Friday, December 3, 4, 5, and 6, 1918, at Musical Fund Hall in Philadelphia and the University of Pittsburgh, Pittsburgh. The practical examination will be held on Friday, December 6th, the last day. Application papers can be secured from the department of Public Instruction, Harrisburg.

For further information address

ALEXANDER H. REYNOLDS,
4630 Chester ave., Philadelphia, Pa.

New Jersey Board of Registration.

THE State Board of Registration and Examination in Dentistry of New Jersey will hold their annual meeting and examination in the Assembly chamber, at the State-house, Trenton, N. J., on December 2, 3, 4, 5, and 6, 1918. License fee, $25; re-examination fee, $10. Practical tests required: Insertion of an approximal gold filling, with approximating tooth in position, compound approximal amalgam filling, a silicate filling, practical test of the applicant's ability in oral prophylaxis, and preparation of a cavity for an inlay with wax pattern. Also the soldering of a bridge consisting of three or more teeth exclusive of abutments, and one Richmond crown, which may be one of the abutments of the bridge; these must be made of gold or silver. The bridge must be struck from dies made from an impression of the mouth, and the articulating model, with the bridge, when soldered, must be submitted for inspection. An anatomical articulation of a full upper and lower set of teeth will also be required; teeth to be furnished by applicant. Wax bite properly trimmed and in place on models for inspection before setting up teeth.

Attention is directed to the following quotation from the dental law of New Jersey:

"Applicant shall present to said board a certificate from the Commissioner of Education of this state, showing that before entering a dental college he or she had obtained an academic education consisting of a four-year course of study in an approved public or private high school, or the equivalent thereof." In accordance with this law the secretary will issue application blanks only upon presentation of the required certificate from the Commissioner of Education, State-house, Trenton, N. J.

Note.—Dental Radiography will be added to the list of theoretical examinations in June 1919.

Applications must be filed complete ten days before the date of the examinations. Address all communications for further particulars to

JOHN C. FORSYTH, *Sec'y*,
430 E. State st., Trenton, N. J.

Oklahoma Board of Examiners.

THE Oklahoma Board of Dental Examiners will hold their next regular semi-annual meeting at the State Capitol building, Oklahoma City, Okla., beginning December 9, 1918. Reciprocity only with Kansas, Missouri, Arkansas, Nebraska, Indiana, and District of Columbia.

For further information address

H. OVERBEY, *Sec'y*,
Ryan, Okla.

Delaware Board of Examiners.

THE next meeting of the Delaware State Board of Dental Examiners will be held on January 15, 1919. Candidates for examination must give written notice of their desire to take the examination at least two weeks before the date of meeting, accompanied by the examination fee of $25. The place of meeting will be given upon notice of intention of taking the examination.

W. S. P. COMBS, *Sec'y-Treas.*,
Middletown, Del.

Rhode Island Board of Registration.

THE semi-annual meeting of the Rhode Island Board of Registration in Dentistry, for the examination of candidates, will be held at the State-house, Providence, R. I., December 3, 4, and 5, 1918.

Applications with fee must be in the hands of the secretary one week previous.

For further information address

ERNEST A. CHARBONNEL, *Sec'y*,
139 Mathewson st., Providence, R. I.

Registration of Dentists—December.

ATTENTION is called to the following amendment to Chapter 181 of the General Laws of 1909, entitled "Of the Regulation of the Practice of Dentistry":

SECTION 3. Every person engaged in, or licensed to engage in if not actively engaged in, the practice of dentistry in this state shall annually in the month of December of each year, beginning December 1918, and every person who shall hereafter engage in the practice of dentistry in this state shall before so engaging and thereafter annually in the month of December of each year, beginning December 1918, cause his name, address, and place of business, if in business for himself, and if not in business for himself then his name, and the name, address, and place of business of his employer, to be registered with said board, which shall keep a book for that purpose; and each person so registering shall pay said board a fee of one dollar at the time of each registration, and shall receive a certificate of registration for the next succeeding calendar year from said board.

Those interested will please notify the secretary of their addresses.

ERNEST A. CHARBONNEL, *Sec'y*,
139 Mathewson st., Providence, R. I.

UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING SEPTEMBER 1918.

September 3.

No. 1,278,066, to VINCENT J. LUONGO. Dental tool.

September 10.

No. 1,278,124, to JOSEPH H. ELLIOTT. Tooth-crown holder.

No. 1,278,153, to SAMUEL L. JEFFERIES. Dental mixing-slab.

No. 1,278,225, to MORRIS I. SCHAMBERG. Tooth and mouth cleanser.

No. 1,278,415, to WILLIAM W. ATKINSON. Artificial tooth.

No. 1,278,744, to PAUL POETSCHKE. Alloy and method of purifying same.

No. 1,278,789, to SAMUEL H. THOMPSON. Toothbrush sterilizer and retainer.

No. 52,385, to ELIZABETH B. CLAPP. Design for toothbrush.

No. 52,388, to WILLIAM F. GRAUL. Design for toothbrush handle.

No. 52,389, to WILLIAM F. GRAUL. Design for toothbrush handle.

No. 52,390, to WILLIAM F. GRAUL. Design for toothbrush handle.

No. 122,687, to J. C. BOLDOOT. Trade-mark for paste for cleaning teeth.

September 17.

No. 1,278,997, to OSCAR H. and ALPHONSE F. PIEPER. Supporting bracket for electrical instruments.

No. 1,279,026, to ERNEST SIEVERS. Dental floss holder and manipulator.

September 24.

No. 1,279,507, to CLARE BRIGGS. Toothbrush.

No. 1,279,549, to JOHNSTON, BROWNE, and WALLACE. Anesthetic administering apparatus.

No. 1,279,664, to HENRY L. CRUTTENDEN. Dental cement injecting tube.

No. 1,279,695, to FRANK J. HOLLIS. Paste tube.

No. 1,279,738, to THEODORE W. MAVES. Oven for burning out invested models.

No. 1,279,805, to NELSON B. WHITAKER. Anchoring means for artificial teeth.

No. 1,279,996, to CLIFTON C. DORLAND. Rotary toothbrush.

INDEX TO VOLUME LX.

1918.

First pages of monthly issues:

	PAGE		PAGE		PAGE		PAGE
JANUARY	1	APRIL	287	JULY	555	OCTOBER	857
FEBRUARY	101	MAY	381	AUGUST	659	NOVEMBER	963
MARCH	197	JUNE	473	SEPTEMBER	759	DECEMBER	1071

ABBE, ROBERT, "Paget's Disease of the Bone," review of, 451
Abnormal mouths, restoration of, before inserting plates, 414
Abscess, acute alveolar, 13
  apical, case of blindness caused by, 673
  effect of, on the root-ends, 25
Abscessed teeth, use of Dakin's solution for, 176
Abscesses, blind, 212
  pericemental, upon vital teeth, 570, 668
  periodontal, 1091
Abutment, inlay, 1164
Academy of Stomatology of Philadelphia, proceedings of, 250, 334, 614, 710
Accidents from local anesthetics, reporting of, 281
After-pain following operation, 634
  in extraction, to avoid, 266
"l'Aide Confraternelle," American contributions to, 348, 624
  appeal for French dentists made by (see editorial), 81
Aiguier, Jas. E., "Improved Method of Casting Splints and Use of Headgear in Treating Fractured Jaws," 602
Air-bubbles in plaster casts, to avoid, 727
Alabama Board of Examiners, 553
Albray, R. A., "President's Address" (New Jersey State Dental Society), 1019
Alcohol sterilization, 529
Alcresta ipecac, 87
Aller, Thos. G., "War Surgery," 1025
Allison, Clarence S., "The Bactericidal Action of Arsenical Compounds on Experimentally Produced Streptococcic Septicemia," review of, 830
Alveolar lesions which accompany pyorrhea, 759
Alveolar processes of the jaws, healthy and diseased conditions of the, 426
  operation for removing a portion of the, 999
Alveolar resorption in pyorrhea alveolaris, Hopewell-Smith on, 763
Alveoloclasia, 1091
Amalgam, matrices for, 178
  technique for packing, 359
  to reduce expansion and contraction of, 1061
Amalgam carrier, an, 176
Amalgam fillings, 453
  large, in doubtful teeth, 634
  matrices for, 1163
Amalgam restorations, 978
  for gold crowns, 95
Ambrine, 175
American Academy of Oral Prophylaxis and Periodontology, announcement, 657
American Ambulance Hospital of Paris, at Neuilly—operative dental section (illustration), 330
"American Illustrated Medical Dictionary," by W. A. N. Dorland (bibliographical), 349
American Institute of Dental Teachers, announcement, 99, 551, 1172
American Medical Association—Section on Stomatology, announcement, 468
American Society of Orthodontists, announcement, 375
Amputation, root, technique of, 381, 914
Anaphylaxis in connection with asthma, hay fever, and various skin diseases, 1112
"Anatomy and Histology of the Mouth and Teeth" (bibliographical), by I. N. Broomell, 625
Anderson, H. B., "Relationship of Oral Sepsis to Systemic Disease, and Its Bearing on Treatment," review of, 942
Anesthesia, conduction, 64, 894
  general, methods of, in facial surgery, 942
  local, for painless operating, 356
  local, indications and contra-indications, 358
  nerve-blocking, advantages of, 729
  nitrous oxid-oxygen, changes in the blood produced by, 633
  oral, 238
  oral, infiltration, 239
  oral, local, contra-indications for, 239
  oral, mandibular, technique for, 238
  oral, tuberosity, 239
  procain-suprarenin, after-effects, 971
Anesthesia and antiseptics in plastic restoration of the face and mouth, 942
Anesthesia and respiration, 355
Anesthetic, the new local: Apothesin, 92, 298
  local, solutions, to increase efficiency of, 175
  why chloroform as an, is more powerful and dangerous than ether, 170
Anesthetics, local, comparative efficiency of, 259
  local, reporting accidents from, 281
  local, sterilization of, 945
  selection of, for oral surgical operations, 209
  some common, toxic factors of, 260
Aneurysms of arteries of the head and neck, 88
Angina, Vincent's, 355
  Vincent's, from the oral surgical standpoint, 296
Angioma of the tongue, congenital, a case of, 169
Angle's law for obtaining harmony of features through tooth movement, 486
Angle's ribbon arch, to fit and apply, 1163
Anhaeusser, H., "Care of Children's Teeth," 911
Anilin dye as a germicide, 636
Annealing lingual bars, 356
Anomalies, occlusal functional inefficiency of the teeth associated with, 168
Anomaly, a dental, 539
Anthony, L. P., "Brief Review of Current Dental Literature," 301
  "Dental Bibliography: The Need of an Index of Periodical Literature," 128
Antiseptic, iodin as an, 356
Antiseptic surgery, principles of, 586

Antiseptics, chlorin, 947
of the chlorin group, and acriflavin and other dyes, relative germicidal efficiency of, 91
toxicity of certain widely used, 722
Antiseptics and disinfectants, root-canal surgery with and through, 538
Apical infections, 983
Apical inflammation, chronic, and its treatment, 169
Apicoectomy, 500
replanting *vs.*, 473
Apothesin, 452, 730
chemical composition of, 298
technique of injection, 299
Approximal interspaces, conservation of, 976
Arch form, 730
determined by size and shape of teeth, 488
Arch, Angle's ribbon, to fix and apply, 1163
desirability of a method to determine the shape of, 483
original method of outlining for orthodontic procedure, clinic on, 64
the normal, and dental engineering, 483
Armies, British and French, Vincent's angina in the, 750
overseas, some experiences in the camps and fields of, 1119
Army Dental Corps, Expansion of (editorial), 935
Army dental corps, examination of candidates for, 1064
promotions and assignments, 97, 192, 276, 370, 462, 543, 650, 751, 852, 955, 1065, 1168
Army, American, dentistry and the health of, 749
dentistry as a separate department of the, 222
English, dental treatment in the, 186
English, teeth of the, 749
need of more prosthetic dentists in the, 224
type of denture for use in the, 516
Army cantonment, the dental clinic in the, 704
Army dental service, the New Zealand, 953
"Army Dentistry," by F. A. Keyes, review of, 827
Army dentistry, 1107
compared with that in civil life, 504
Army and Navy Dental News, 97, 183, 367, 459, 541, 647, 748, 850, 950, 1062, 1166
Army Medical Corps, on the standard as to numbers in grades of commissioned *personnel* of, 541
Arsenic, use of, for destroying pulps, 176
Arsenical compounds, bactericidal action of an experimentally produced streptococcic septicemia, 830
Articulation, anatomical occlusion and, in artificial dentures, 455
temporo-mandibular, in the human type, 505
Articulator, use of, in plate work, 882, 1111
Artificial teeth, type *vs.* temperament in selection, 108
Asepsis, logical, in dental practice, 31
vs. antisepsis in root-canal procedures, 491
Asepsis and antisepsis in modern dentistry, 1059
Ash, C. F., on logical asepsis in dental practice, 77
on the Preparedness League of American Dentists, 1024
Asthma, hay fever, and various skin diseases, anaphylaxis in connection with, 1112
Atlanta-Southern Dental College, commencement of, 747
Atmospheric pressure in retention of dentures, 357
Austin, J. H., and H. D. Taylor, "Toxicity of Certain Widely Used Antiseptics," 722

Babonneix, L., and Lorgnier, "A New Case of Heredo-syphilis Nerviosa," review of, 447
Backing, platinized gold, substitute for, 176
Bacteriological examination, collecting material for, 537
Bacteriology, dental, present status of, 171
Baltimore College of Dental Surgery, announcement of, 375
commencement of 643
Band, gold, to measure the circumference of a tooth for, 945
of a gold crown in the bronchus; report of a case, 905
Bands, matrix, method of keeping, 452
Banzhaf, H. L., "Minimum Requirements for Class A Dental Schools" (Dental Educational Council), 701
Barker, Lewellys F., and Sydney R. Miller, "Perforating Ulcer of the Hard Palate Resembling Tertiary Syphilis," but Due to a Fuso-spirillary Invasion," review of, 1160
Barnhard, Wm. H., "Dentistry as a Career" (correspondence), 53
Barrett, T. J., on president's address (Northeastern Dental Association), 156
on the relation of the surgeon and the dentist in face and jaw diseases, 246
Bars, lingual, annealing, 356
Bartleman, F. C., "Dental Service in France" (correspondence), 148
Base-plate, construction of, 880
Batson, B. A., "Exodontia," 1006
Bayley, Malcolm W., "The Dental Clinic in the National Army Cantonment," 704
Beach, J. W., on the Preparedness League of American Dentists, 813
Beeswax, using, 91
Behan, R. J., "Loose Cartilage in the Temporomaxillary Joint," review of, 835
Bell, Geo. C., "A Case of Nasal and Palatal Restoration," 131
Bell, Thomas, on precocious senility of the alveolo-dental tissues, 762
Bibliographical: A brief review of current dental literature, by L. P. Anthony, 301
dental; need of an index of periodical literature, 128
Bismuth-iodoform-paraffin paste, 634
Bismuth poisoning as affecting the oral cavity, 451
Bismuth salicylate for root-filling, 728
Bite, determining the length of the, 453
method of taking, 227, 406, 840, 881, 883
Black, Greene Vardiman, Memorial (The), editorial, 824
Black, Harvey G., "Relation of Chronic Infection to Thyroid Deficiency," review of, 264
Black's cavity preparation, principles of, 1
Black's glandular epithelial cells, 556
Blair, V. P., "Septic Parotitis," review of, 172
"Surgery and Diseases of the Mouth and Jaws" (bibliographical), 257
"The Aims of the Subsection of Plastic and Oral Surgery," 125
Blanquie, Raoul H., "Camp Fremont Dental Corps Notes," 1166
Bleaching teeth, 356
Blepharospasm secondary to pyorrhea alveolaris, 834
Blight, Fred J., "Bismuth Poisoning as Affecting the Oral Cavity," review of, 451
Blindness, case of, result of infection from apical abscess; cured by apicoectomy, 673
Bliven, C. Frank, on engineering principles applied to dentistry, 341
Blocking the ophthalmic branch of the fifth nerve, 1060
Blood coagulation, factors concerned in, 688
thromboplastin in treatment of, 689
Blood diseases may produce symptoms in the mouth, 236

Blood poisoning, result of negligence in sterilizing instruments, 645
Blood stains, removing, 356
Body growth, relation of dentition to, 899
Bogue, E. A., on the diagnosis of malocclusion in its early stages, 816
Bone, atrophy or physiological absorption of, 428
Paget's disease of, 451
transplantation of, 533
Bone-grafting in gunshot wounds of the mandible, 632
Bone-grafts, experiments with the use of, 258
Bone regeneration in the adult, 168
Books received, 258, 526, 716, 828, 1153
Bouty, R. J. C., "Vincent's Angina Among the Troops in France," 750
Bowman, F. B., "A Case of Vincent's Infection Involving the Mouth, Eyes, and Penis," review of, 87
"Infectious Ulcero-membranous Stomatitis and Gingivitis," review of, 534
Breath, bad, causes of, 532
Breda, Achille, "Primary Syphilis of the Gums," review of, 529
Bridge, clasp, advantages of, 208
clasp, disadvantages of, 208
clasp, technique of making, 205
Bridges, mobile, 629
Bridges and crowns, setting, 277, 727
Bridge work, 1106
casting dummies for, 635
faulty co-ordinating, traumatism due to, 321
fixed, the basic principle of, 536
perfect, requisites of, 325
plaster bite for, 1164
proper occlusion a necessity in, 322
removable, with cast clasps, a simple form of making, 204
use of the anatomical articulator in, 323
British prisoners of war, twelve months with, 950
Broaches, to prevent falling of, into the throat, 727
Bronchoscopic cases, three, the result of dental procedure, 359, 1158
Bronchoscopy, lower, tooth impacted in a secondary bronchus of the left lung removed by, 1158
Bronchus, band of a gold crown in the, 905
Brooks, M. M., and W. A. Price, "The Relative Efficiency of Medicaments for the Sterilization of Tooth Structures," review of, 531
Broomell, I. N., "Anatomy and Histology of the Mouth and Teeth" (bibliographical), 625
"Dentist or Stomatologist?" 980
Bryan, L. C., obituary notice of, 457
Bulkley, L. Duncan, "Cancer of the Oral Cavity," 774
Bunting, R. W., "The Effect of Mouth Infections upon the General Health," 229
Burchard, H. H., on the nature of pericemental abscesses on vital teeth, 571
Burge, W. E., "Why Chloroform is a More Powerful and Dangerous Anesthetic than Ether," review of, 170
Burgess, Jas. K., "Nature's Tolerance and Compensating Adjustments as Related to Efficient Dentures," 986
"Success in Oral Restoration: What are the Fundamental Principles upon Which It Must be Based?" 785
Burns, paraffin treatment of, 175, 637
Burns, Robert, Jr., "Septic Teeth: Their Etiology and Surgical Treatment" (correspondence), 241
Byrnes, R. R., "The Principles of Black's Cavity Preparation," 1
CALCULUS, salivary, 832
Calculus, salivary and so-called serumal, 661
California Board of Dental Examiners, 471, 1172
California State Dental Association, announcement, 285
Callahan, J. R., "Logical Asepsis in Dental Practice," 31
obituary of, 360
Campbell, J. L., "Tumors of the Gums," review of, 528
Camp Fremont Dental Corps notes, 1166
Camp Pike Dental Society, announcement, 276
Camps and fields of the armies overseas, some experiences in, 1119
Canadian Dental Association, announcement, 657
Canan, C. W., "Causes of Bad Breath," review of, 532
Cancer, deaths from, 535
nitrate of silver contra-indicated in treatment of, 776
of the jaws and cheeks, heat and radium in treatment of, 831
of the lip, treatment of, by radium, 632
of the mouth and face, 839
of the oral cavity, 774
Cancer and other diseases of the oral cavity, importance of accurate differential diagnosis between, 775
Canker, 235
Carabelli, significance of the tubercle of, 447
Caries, causes of, of general systemic origin, 663
electrobiolytic theory of, 26
rarity of, among pyorrhetic patients, 664
relation of oral secretions to, 140, 197, 287
studies on, 173
Carr, Cassius M., patent declared void, 734
Carr, Wm., "History of the Dental Society of the State of New York," 793
Carrea, Juan A., "A Case of Pyorrhea Alveolaris Treated by Intra-muscular Injections of Emetin Hydrochlorid," review of, 259
Carrier for amalgam, 176
Carroll, Rufus W., obituary of, 639
Carter, W. W., "Salivary Calculus," review of, 832
Cast, making a workable, 357
Casting, centrifugal, 635
Casting dummies for bridge work, 635
Casting Watt's metal plates with porcelain teeth, to get the best results in, 265
Castings, to obtain smooth, 452
Casto, T. D., "Changes Produced in the Blood by Nitrous Oxid-Oxygen Anesthesia," review of, 633
on impression taking, 250
Casts, flowing the, in plate work, 880
separating, from the plaster impression, 880
Cavities, preparation of, by classes, 6
Cavity preparation, Black's principles of, 1
extension of margins for prevention of recurrent decay, 3
seven steps in, 4
Cement, a hint on mixing, 356
silicate, precautions in the use of, 728
silicate, spatulation of, 727
Cement filling, silicate, reinforced, 358
Cements, silicious, to maintain dryness of gingival cavity without rubber dam, in using, 841
Cementum, the, 427
Cevey, Marcel, "A Clinical and Bacteriological Study of the Reinfection of Root-canals, especially After Treatment with Tricresol-formalin and Peruvian Balsam-iodoform," review of, 720
Chalier, J., "Frequency of Vincent's Angina," review of, 941
Chewing, thorough, as an economic measure, 93

Chiavaro, Angelo, "Three Rare Cases of Replantation of the Teeth," review of, 261
"Replantation of Teeth" (correspondence), 613
Chicago College of Dental Surgery, commencement of, 846
Chicago Dental Society, announcement, 199
Children's teeth, care of, 911
extraction of, 913
filling materials for, 913
pulp exposure in, 912
treatment of cavities in, 912
Chin, evolution of, 123
Chinosol in root-filling, 838
Chipman, E. D., "Focal Infection in the Etiology of Skin Disease," review of, 836
Chloramin-T solutions and hypochlorite, behavior of, in contact with necrotic and normal tissues *in vivo*, 722
Chlorcosane apparently the ideal solvent for dichloramin-T, 453
Chlorin, history of, as an antiseptic and disinfectant, 1072
Chlorin antiseptics, 947
Chloroform, why it is a more powerful and dangerous anesthetic than ether, 170
Chloro-percha, radiolucency of, 433, 611, 708, 808
Christiansen, J., "Alcohol Sterilization," review of, 529
Churchman, J. W., "Fibroma of the Tongue, with Considerations of Other Tumors of the Tongue and Certain Technical Points in Tongue Resections," review of, 837
Cincinnati College of Dental Surgery, commencement of, 736
Clark, R. A., "Professional Capability and Dental Commissions" (correspondence), 918
Clarke, F. B., "in memoriam" resolutions, 96
Clasp, as an anchorage for partial dentures, 840
Clasps, cast, for removable bridge work, 204
Classification of Dental Schools as adopted by the Dental Educational Council of America, 937
Clean mouths, economic value of, to the community, 295
Cleft, alveolar, and of hard and soft palate, surgical correction of, 581
Clemons, E. Jay, "True Pruritis Ani: Its Association with Pyorrhea Alveolaris," review of, 944
Clifford, Isidore, "The Use of the Drill as an Aid to Tooth Extraction" (Hints), 1157
Clinic, school dental, at Tonawanda, 840
Clinics, dental, in Manila, 1115
Cohen, M. B., "An Experimental Study of Root-filled Teeth: Preliminary Report," review of, 450
Cole, Percival P., "Non-union of War Fracture of the Mandible," review of, 629
Collapse under anesthesia due to an enlarged thymus gland, 515
College of Dental and Oral Surgery of New York, commencement of, 741
College of Jersey City, Department of Dentistry, commencement of, 740
College of Physicians and Surgeons, commencement of, 845
Colorado College of Dental Surgery, commencement of, 846
Commissions, dental, and professional capability (correspondence), 918, 1129
Compound, instructions in re-sterilizing, 1162
Conduction anesthesia, 1124
instrumentarium for, 1124
method of making injections, 1125
preparation of the solution, 1125
Connecticut Dental Hygienist's Association, announcement, 376
Connecticut State Dental Association, announcement, 99
proceedings of, 815, 1142
Conservation of time in teaching dental students, 772
Contact point, the interproximal, 839
Continuous-gum set, a new, 719
Conzett, J. V., on the filling of root-canals, 1135
Cooke, A. R., logical asepsis in dental practice, 76
Cooper, Ashley, "Case of Chronic Nephritis: Uremia: Severe Hemorrhage from Gums," review of, 530
Co-operation in Scientific Research (editorial), 821
Coriat, Isador H., "Collapse under Anesthesia Due to Enlarged Thymus Gland," 515
"The Presence of Taste Fibers in the Lingual Nerve," 217
Coriell, L. D., "A Dental Trocar" (Hints), 1154
Cotton rolls, to hold in place while operating, 265
Crane, Arthur B., "When Shall Root-canals be Filled, and How?" 1093
Cretinism, 137
Crockett, Frank S., "Kidney Infection as a Result of Pyorrhea," review of, 449
Crown, cementing the, 407
porcelain, new method for making, 839
porcelain jacket, preparation of tooth at the gum margin for, 728
preparing the stump of a bicuspid or molar for, 535
Crown and bridge soldering, an aid in, 265
Crown and bridge work, successful, Jas. K. Burgess on, 785
taking the bite for, 840
Crown, shoulder, aid in the technique of, 945
Crowns, jacket, restorations with, 402
Crowns and bridges, setting, 727
Crowns and fillings, faulty, evil results of patching, 175
Culver, G. D., and D. W. Montgomery, "Paralysis of the Facialis Caused by Salvarsan," review of, 170
Curet, a new, 889
the adjustable, 890
the surgical, 888
Curetting, 888
filing and, 538
Cyst, follicular dental, report of a case of, 319
radicular, operation for, 390
Cysts, dentigerous or follicular, 215
dentigerous, with report of case, 944
of the dental system, 555
periodontal or radicular, 214
retention, of the mucosa of the lip, 831

Dakin, Henry D., and Edw. K. Dunham, "A Handbook of Antiseptics" (bibliographical), 524
"Solvents for Dichloramin-T," review of, 351
"The Relative Germicidal Efficiency of Antiseptics of the Chlorin Group and Acriflavin and Other Dyes," review of, 91
Dakin's solution for abscessed teeth, use of, 176
Daland, Judson, "Ulcerative Endocarditis Secondary to Dental Sepsis, Treated by Autogenous Vaccine," review of, 832
Dalhousie University, Dental Department, commencement of, 844
Daniels, Benj., "Professional Capability and Dental Commissions" (correspondence), 1129
David, John W., obituary notice of, 270
Davis, Isaac H., "in memoriam" resolutions, 639
obituary of, 456
Davis, W. Clyde, "Radiolucency of Chloro-percha," 433, 808
Decayed teeth, effects of, upon a child's progress in school, 293
Delabarre, Frank A., "The Diagnosis of Malocclusion in Its Early Stages," 789

Delabarre, Frank A., on engineering principles applied to dentistry, 338
Delaware Board of Examiners, 1173
Delta Sigma Delta Fraternity, announcement, 467, 757
Demarquette, J. C., "Senility of the Dental Tissues Among Soldiers," review of, 452
Denney, R. E., "Report of a Case of Follicular Dental Cyst," 319
on prophylaxis propaganda among the laity, 713
"Dental and Oral Radiography," by J. D. McCoy (bibliographical), 626
Dental commissions and professional capability, 918
Dental corps, vacancies in, 954
"Dental Electro-therapeutics," by Ernest Sturridge, review of, 827
Dental Histology and Embryology, Textbook of, by F. B. Noyes (bibliographical), 626
Dental law, appointment of a permanent committee on, by the Dental Society of the State of New York, 797
first, in New York State, 794
of New York, effect on dental education, 795
Dental Library Association, announcement, 283
Dental practice, logical asepsis in, 31
Dental profession, enlarged opportunities for the, under present world conditions (see editorial), 444
Dental Protective Association, announcement, 1172
Dental Reserve Corps, promotions in, 543, 751
Dental Schools, Classification of (editorial), 937
Dental schools, minimum requirements for class A (Dental Educational Council), 701
Dental Service, Industrial (editorial), 521
Dental Society of the State of New York, history of, 793
organization of, 794
presentation of Fellowship medal to J. R. Callahan, 73
proceedings of, 73, 549, 809, 920
Dental students of well-recognized dental schools, enlistment of, in medical enlisted reserve corps, 748
Denticles, removal of thirty from one bicuspid socket, 636
Dentin, hypersensitive, clinical methods of treating, 88
sensitive, 727
sterilization of, 727
Dentist, increased responsibilities of the, in the present world-war, 220
Dentist and surgeon, co-operation between, necessary in present world-war, 126
Dentistry in the New Era (editorial), 441
Dentistry, after the war; a promising professional field for young men, 806
as a career, 53
in the army and in civil life, 504
the next quarter century in, 1102
twenty years ago and today, 179
Dentistry and the war: American Ambulance Hospital of Paris, at Neuilly, operative dental section of (illustration), 330
Dentistry in Relation to Reconstruction (editorial), 1149
Dentition, difficult, lancing the gums in, 92
relation of, to body growth, 899
Denture for army use, a type of, 516
vulcanite, method of replacing a broken tooth in, 535
Dentures, clasped, advantages of, 455
clasped partial, *versus* bridge work, 629
finishing, 727
full, impressions for, 168
full, retention of, 530
full upper, on a gold base, 453
Dentures (natural), unclean yet sound, 52
partial, the clasp as an anchorage for, 840
reliefs in, 536
retention of, atmospheric pressure in the, 357
upper and lower, careful technique the greatest factor in the construction of, 876
Detweiler, H. K., and H. B. Maitland, "The Localization of Streptococcus Viridans," review of, 173
Deupès, "Two Cases of Fistula from the Parotid Gland Cured by Resection of the Auriculotemporal Nerve," review of, 352
Devitalized pulp, to relieve pain of, 1162
Devitalizing pastes, use of, 493
Dewey, Kaethe W., "Cysts of the Dental System," 555
"The Lipoids in Tumors of the Dental System," review of, 831
DeWitt, N. A., "Radiolucency of Chloro-percha" (correspondence), 708
Diabetes, early symptoms of, in the mouth, 236
Diagnosis, mouth, clinic on, 65
X-ray, should it supplement or supersede the clinical? 265
Dichloramin-T, chlorcosane apparently the ideal solvent for, 453
general action of antiseptics with reference to, 1076
idiosyncrasy to, 1060
pharmacology of, 1073
remarks on, 354
solvents for, 351, 1074
Die and counter-die for swaging saddles, 634
Dieulafé, L., "Salivary Fistulæ," review of, 352
Dietetics and oral hygiene, 840
Discussion on "A Comparison of Office Policies, with Special Reference to Pulp Exposure or Death," 710
on "Anaphylaxis in Connection with Asthma, Hay Fever, and Various Other Skin Diseases," 1143, 1145
on "A Simple Form of Removable Bridge Work, with Cast Clasps," 246
on "Care of the Mouth During Pregnancy," 334
on "Correspondent's Report" (Dental Society of the State of New York), 924
on "Dentist or Stomatologist?" 1027
on "Engineering Principles Applied to Dentistry," 338
on "Exercises for the Development of the Muscles of the Face, with a View to Increasing Their Functional Activity," 932
on "Experimental and Clinical Study of the Isolated Thyroid Hormone," 159
on "Healthy and Diseased Conditions of the Alveolar Processes of the Jaws," 437
on "Logical Asepsis in Dental Practice," 76
on "Method of Taking Modeling Compound Impressions with the Mouth Closed and Under Normal Biting Strain," 250
on "Movement of Teeth Pre-determined by Engineering Instruments: Appliances Designed in Accordance with Analytical Mechanics," 69
on "Nature's Tolerance and Compensating Adjustments as They Relate to Oral Restoration," 1139
on "Non-cohesive Gold," 710
on "Orthodontic Treatment of Advanced Cases, and Patients Coming from a Distance," 66
on "Pathology, Etiology, and Treatment of Pyorrhea," 614
on "President's Address" (Eastern Angle Association), 929
on "President's Address" (Northeastern Dental Association), 154
on "Primary Factors in the Etiology of Periodontoclasia," 1136

Discussion on "Procain for Dental Operations," 1036
on "Report of a Case of Follicular Dental Cyst," 335
on "Report of Committee on Practice" (Dental Society of the State of New York), 921
on "Selection of Anesthesia for Oral Surgical Operations, and the Roentgen Ray as an Aid in Diagnosis," 244
on "Some Experiences in the Camps and Fields of the Armies Overseas," 1130
on "The Bearing of Physical Anthropology on the Problems of Orthodontia," 332
on "The Conservation of the Approximal Interspaces, Together with the Adjustment of Occlusal Relationships," 1132
on "The Control of Focal Infections," 1010
on "The Diagnosis of Malocclusion in Its Early Stages," 816
on "The Evolution of Orthodonty," 435
on "The Influence of General Health on Oral Tissue," 242
on "The Needs of Prosthetic Dentistry," 1130
on "The Past and Present of Operative Dentistry," 920
on "The Physiological Age: The Relation of Dentition to Body Growth," 931
on "The Relation of the Surgeon and Dentist in Face and Jaw Injuries," 246
on "When Shall Root-canals be Filled, and How?" 1134
Disease, pathological changes induced by, in the oral tissues, 431
Disinfection, methods of, as carried out in dental offices, an investigation of, 631
Dislocation, recurrent, of lower jaw, 1060
Dolamore, W. H., "Further Experiments with the Use of Bone-grafts," review of, 258
Dorland, W. A. N., "American Illustrated Medical Dictionary" (bibliographical), 349
Doubleday, A. W., on the pathology, etiology, and treatment of pyorrhea, 615
Drea, Wm. A., "Hemorrhage and Its Treatment," 688
Drexler, John H., "Method of Taking Modeling Compound Impressions with the Mouth Closed and Under Normal Biting Strain," 225
Drill, use of, in tooth extraction, 1157
Dryness of gingival cavities, maintaining, without rubber dam, especially useful with silicious cements, 841
Duchange, R., "Oculo-cardiac Reflex in Cases of Contractures of the Jaws," review of, 263
Ductless glands, relation to mouth conditions, 237
Duke, Wm. W., "Oral Sepsis in Its Relationship to Systemic Disease" (bibliographical), 627
Dunbracco, W. W., on the conservation of the approximal interspaces, 1133
Dunham, Edw. K., and H. D. Dakin, "A Handbook of Antiseptics" (bibliographical), 524
"Remarks on Dichloramin-T," review of, 354
"Solvents for Dichloramin-T," review of, 351

EASTERN Association of Graduates of the Angle School of Orthodontia, announcement, 377
proceedings of, 66, 159, 331, 435, 928
Eaton, A. R., obituary notice of, 638
Education, dental, tending toward stomatology, 984
Educational requirements, minimum, for class A dental schools (Dental Educational Council), 701
Elander, Karl, "The Principles Governing the Construction of Permanent Fixatures in the Treatment of Pyorrhea Alveolaris; with a New Method of Construction," 671
Electro-activity in the mouth, evidence of, 26
Electrolysis in the mouth, factors in the institution or modification of, 27
possible course of process of, 28
Emetin hydrochlorid, treatment of pyorrhea by intramuscular injections of, 259
Enamel, mottled, investigation of, with special reference to its association with artesian water, 831
Enamel rods, inclination of, 1
Encapsulation of the root-end, 727
technique of, 729
Endamœba buccalis, its reactions and food-taking, 262
Endelman, Julio, on urate deposition, 665
Endocarditis, ulcerative, secondary to dental sepsis, treated by autogenous vaccines, 833
Endocrine function, Janney's hypothesis of, 138
Engineering, dental, and the normal arch, 483
Engineering instruments, movement of teeth predetermined by, 39
Engineering principles applied to dentistry, 336
English "Ivory Cross" Fund, the, 542
Epulides, pathological anatomy of, 528
Epulis, giant-cell, of the upper jaw, 528
Erausquin, R., "The Pathological Anatomy of Epulides," review of, 528
Esser, J. F. S., "Healing of Lower Jawbone Defects in War Cripples," review of, 172
Essig, Norman S., "The Needs of Prosthetic Dentistry," 1108
"Type *vs.* Temperament in the Selection of Teeth" (IV), 108
Estey, Harold W., obituary of, 1165
"Exodontia," 1006
anesthesia in, 1007
Expansion and contraction of amalgam, to reduce, 1061
Expansion of the Army Dental Corps (editorial), 935
Extracting diseased teeth, the question of, 839
Extraction, to avoid after-pain in, 266
use of the drill in, 1157
Extractions, impactions, and exostoses, difficult, 211
Extraction wounds, nature's method of caring for, 105
Eye, diseases of, from focal infection, 834

FACE, human, evolution of, 115
of vertebrates, first presented in its typical form in the sharks, 116
Face and jaws, war injuries of the; collective review, 1054
Facial development, general, exercise for, 870
Facial muscles of mammals, clue to origin of, 118
Fanz, J. I., "The Use of Sandpaper in the Preparation of Histologic Ground Sections of Hard Substances," review of, 943
Faught, F. A., "Essentials of Laboratory Diagnosis" (bibliographical), 715
"Non-cohesive Gold," 685
Faught, L. Ashley, "The Conservation of Approximal Interspaces, Together with the Adjustment of Occlusal Relationships," 976
Favre, M., "Mercurial Stomatitis: Its Pathogenesis, Prophylaxis, and Treatment," review of, 86
Federspiel, M. N., "Surgical Correction of a Double Hare-lip, Alveolar Cleft, and Cleft of Hard and Soft Palate," 581
Feldman, Harry J., "A Dental Anomaly: Report of a Case of a Rudimentary Impacted Lower Third Molar," 51
Feldman, M. H., "Possible Relationship of Oral Focus to Chronic Osteomyelitis (A Case Report), 147

Fennel, Eric A., "Streptothrix Interproximalis, *nova species:* An Obligate Micro-aerophile from the Human Mouth," review of, 940
Ferments, general definition of, 140
terminology of, 141
Ferris, H. C., on exercises for development of muscles of the face, 933
on healthy and diseased conditions of the alveolar process of the jaws, 438
Fevers, specific, oral sepsis a complication of, 599
Fibrin paper as a hemostatic agent, 944
Fibroma of the tongue, with consideration of other tumors of the tongue, and certain points in tongue resection, 837
Fifth nerve, blocking the ophthalmic branch of, 1060
dental neuralgia or pain referred to branches of, 91
Files, rubber, to clean, 175
Filing and curetting, 538
Filing, importance of a proper contact point in, 1060
reinforced silicate cement, 358
Filling root-canals, technique for, 455
Fillings, amalgam, 453
gold, 885
gold foil, 946
gold foil, for restoring tooth form, 177
gold, indications for, 176
large amalgam, in doubtful teeth, 634
root-, removing, 536
synthetic, in adjoining approximal cavities, matrix for, 175
synthetic, technique of, 946
Fillings and crowns, faulty, evil results of patching, 175
Filling Teeth, Principles and Practice of, by C. N. Johnson (bibliographical), 1152
Film, X-ray, dark areas in the, 93
"First line trench" in dentistry, 777
Fistula from the parotid gland, two cases of, cured by resection of the auriculo-temporal nerve, 352
salivary, 352
Florida State Dental Society, announcement, 377
Focal infection, 1105
control of, 963
diseases of the eye due to, 834
in the etiology of skin disease, 836
most frequent seats of, 1004
surgical conditions resulting from, 1003
Foil fillings, gold, 946
Forceps especially adapted for use in extraction preparatory to replantation, 476
special, for extracting impacted lower third molars, 103
Forsyth Dental Infirmary for Children, announcement, 196, 544
Forsyth Training-school for Dental Hygienists, announcement, 285, 757
Foster, S. W., "The Influence of the War on Dentistry and Dental Colleges," 1001
Fox, F. A., on impression-taking, 252
Fracture of inferior maxilla, technique of wiring corresponding teeth in superior and inferior maxilla, 261
Fractures, jaw, involving extensive loss of structure, cicatricial bands in the treatment of, 316
Fractured jaw, to hold, for impression and adjustment, 838
Fractured jaws, improved method of casting splints and use of headgear in treating, 602
France, dental service in, 148
Frank, Ira, "Dentigerous Cysts, with Report of Case," review of, 944
Fraser, Alexander, "Mixed Tumors of the Salivary Glands: A Study Based on the Experimental Production of Neoplasm in the Submaxillary Gland of the Dog," review of, 837
Frazier, Chas. H., "A Surgeon's Impression of Trigeminal Neuralgia, Based on Experiences with 302 Cases," review of, 829
Free dental clinics, law authorizing establishment of, in municipalities of New Jersey, 644
Free dentistry in New Zealand, 265
French dentists, appeal for aid for (editorial), 81
Fry, W. K., "A Few Notes on the Treatment of Gunshot Wounds of the Mandible and Maxilla," review of, 172
Function, influence of, upon form development, 399

Galippe, V., "An Alleged Dental Stigma of Congenital Syphilis," review of, 447
Gallie, W. E., and D. E. Robertson, "Transplantation of Bone," review of, 533
Gardiner, F. D., on non-cohesive gold, 713
on prevention rather than cure, 713
Gasserian ganglion, tumor of, 941
Gemination, tooth, a case of, 330, 807
Georgia State Dental Society, announcement, 377
Georgetown University, Dental Department, commencement of, 737
George Washington University Dental School, commencement of, 641
Germicide, anilin dye as a, 636
Gernez and Lemière (MM.), "The Conservation and Utilization of Cicatricial Bands in the Treatment of Jaw Fractures Involving Extensive Loss of Substance," 316
Gerstenberger, H. J., "The Pathogenesis of Infantile Scurvy: An Hypothesis," review of, 449
Gillette, Helen H., and Percy R. Howe, "Studies upon Dental Caries," review of, 173
Gillies, H. D., "Two Cases Illustrating Plastic and Dental Operations," review of, 172
Gingival tissue, the, 427
Gingivitis, 1090
infectious, ulcero-membranous stomatitis and, 534
interstitial, 670
not an initial lesion of pyorrhea, 661
Gland, enlarged thymus, collapse under anesthesia due to, 515
Godlee, Sir Rickman P., "Lord Lister" (bibliographical), 445
Gold, non-cohesive, 685
Gold band, to measure the circumference of a tooth for, 945
Gold fillings, indications for, 176
Gold foil fillings for restoring tooth form, 177
Gold foil restorations, 978
Gold inlay method, indirect-direct, 328
Gonococcus infection of the mucous membrane, 534
Gormsen, L., "Mobile Bridges," review of, 629
Goslee, Hart J., "Clasped Partial Dentures *versus* Bridge Work," review of, 629
Gould, Geo. M., "The Practitioner's Medical Dictionary" (bibliographical), 84
Gough, F. A., on report of Committee on Practice (Dental Society of the State of New York), 922
Graham, Evarts A., "Toxic Factors of Some Common Anesthetics," review of, 260
Graham, F. A., "Unclean Yet Sound Dentures" (correspondence), 52
Granuloma cases, surgical technique of root resection in, 266
Granulomata, dental, 14
Graves, M. L., "Oral Sepsis and the Anemias," review of, 352

Graves' disease, theories concerning the pathogenesis of, 137
Green, Jesse Cope, editorial on, 163
Greene Vardiman Black Memorial, The (editorial), 824
Gregory, W. K., "Evolution of the Human Face: Chief Stages in Its Development from the Lowest Form of Life to Man," 115
"The Evolution of Orthodonty," 417
on a study of the isolated thyroid hormone, 160
on healthy and diseased conditions of the alveolar processes of the jaws, 437
on the general correlation of proportions in the skull, 333
Grieve, G. W., on orthodontic treatment of advanced cases, 67
on President's Address (Eastern Angle Association), 929
Grinding and crushing teeth, evolution of, 421
Gropper, Adolph, "Vulcolox Anteriors in the Construction of Richmond Crowns and Bridge Work" (Hints), 939
Grove, Carl J., "Treatment of Root-canals with Putrescent Pulps," review of, 263
Gum margin, preparation of tooth at, for a porcelain jacket crown, 728
Gunshot wounds of the mandible, bone-grafting in, 632
Gunshot wounds of the mandible and maxilla, treatment of, 172
Guthrie, J. M., "The Relation of Nasal and Oral Sepsis to Systemic Disease and Surgical Conditions Resulting from Focal Infections," 1003

Haas, A. R. C., "Anesthesia and Respiration," review of, 355
Haines, H. A., "Vincent's Angina from the Oral Surgical Standpoint," 296
Hall, Rupert E., "Retention of Full Dentures," review of, 530
Hall method of taking impressions, 268
Hard and soft teeth, 728
Hardy, Chas. S., on dentist or stomatologist? 1029
Hardy, Geo. E., on crown and bridge work, 1139
Hare-lip, double, surgical correction of, 581
Harris, C. C., on the conservation of the approximal interspaces, 1132
Hartzell, T. B., and A. T. Henrici, "The Microscopic Anatomy of Chronic Periodontitis and the Pathogenesis of Dental Root-cysts," review of, 174
Harvard Dental School, commencement of, 845
Harvard-Tufts Training-school for Dental Hygienists, 757
Harvey, Samuel C., "Fibrin Paper as a Hemostatic Agent," review of, 944
Haughey, W., and R. D. Sleight, "Macroglossia Lymphangioma, with Report of Case," review of, 944
Hawley, C. A., on exercises for the development of the muscles of the face, with a view to increasing their functional activity, 932
on orthodontic treatment of advanced cases, 67
Hayden, C. E., "Orokinase and Ptyalin in the Saliva of the Horse," review of, 833
Headgears, necessity of, in treatment of fractured jaws, 608
Healing art, dentistry's importance as a department of the (see editorial), 442
Health, the mouth in a state of, 535
Heat and radium in treatment of cancer of jaws and cheeks, 831
Heitz-Boyer and Scheikevitch, "Regeneration of Bone in the Adult," review of, 168
Hellman, Milo, "A Study of Some Functional Inefficiencies of the Teeth Associated with Occlusal Anomalies," review of, 168
on the isolated thyroid hormone, 159
on movement of teeth predetermined by engineering instruments, 70
on the bearing of physical anthropology on the problems of orthodontia, 332
on the evolution of orthodonty, 435
Hemophilia, treatment of, 717
Hemorrhage, treatment of, 688, 689
Hemostatic agent, fibrin paper as a, 944
Henrici, A. T., and T. B. Hartzell, "The Microscopic Anatomy of Chronic Periodontitis and the Pathogenesis of Dental Root-cysts," review of, 174
Herdling, A. C. M., "Stereoscopy, Sinus and Tooth Radiography" (clinic), 65
Herpes zoster, a focal infection, 86
Hertwig's sheath, 559
Hines, C. E., "The Treatment of Pyorrhea Alveolaris," 992
Hoggan, J. A. C., "Orthodontia Treatment of Advanced Cases, and Patients Coming from a Distance," 45
Holbaek-Hanssen, "Aneurysms of the Arteries of the Head and Neck," review of, 88
Hollande, "Ionization Applied to the Treatment of Facial Cicatrices," review of, 632
Hollenbeck, Reuben, obituary notice of, 180
Holmes, Adah R., "An Investigation of the Methods of Disinfection Carried Out in Dental Offices," review of, 631
Hopewell-Smith, A., "On Healthy and Diseased Conditions of the Alveolar Processes of the Jaws," 426
Hovestad, J. F., "Restorations with Jacket Crowns," 402
Howe, Percy R., and Helen H. Gillette, "Studies upon Dental Caries," review of, 173
Howe, Percy R., and Mildred R. Keniston, "The Salivary Factor in Relation to Dental Caries," review of, 835
Hughes, Frank M., "A Case of Congenital Angioma of the Tongue," review of, 169
Hunter, Wm., "The Rôle of Sepsis and of Antisepsis in Medicine," 585
Hutchinson, J., "Operative Treatment of Trigeminal Neuralgia," review of, 940
Hutchinson's teeth, 92
Hygiene, oral, and dietetics, 840
Hygienists, dental, Maine law providing for, 182
Hyperemia, active, of the pulp, treatment of, 177
Hypertrophied tissue, an interesting case of, 356
Hypochlorite and chloramin-T solutions, behavior of, in contact with necrotic and normal tissues *in vivo*, 722
Hypodermic needle, blocked, to clean, 634

Idaho Board of Dental Examiners, 100, 553
Illinois Dental Examiners, 961
Illinois State Dental Society, announcement, 284
Impacted lower third molar, rudimentary, report of case of, 51
Impression, a help in taking an, 175
of fractured jaw, accurate way of taking, 838
the perfect plaster, 94
Impression materials, 1000
Impression-taking, advantages of plaster over other methods of, 879
clinic on, 65
technique of, 877
Impressions, for full dentures, 168
full upper or lower, formulary for, 93
modeling compound, 878
modeling compound, method of taking with the mouth closed and under normal biting strain, 225

Impressions, plaster, a good separating medium for, 727
plaster, 879
plaster, of partial cases, 179
taking, with modeling composition, 92
the Hall method of taking, 268
Indexes, dental, various, 128
Indiana Board of Examiners, 286
Indiana Dental College, commencement of, 740
Industrial Dental Service (editorial), 521
Infantile scurvy, 235
pathogenesis of, 449
Infected root-canals, treatment of, 1078
Infection, chronic, relation of, to thyroid deficiency, 264
chronic focal, incidence of, in chronic diseases, 354
focal, diseases of the eye from, 834
focal, in the etiology of skin disease, 836
menace of, 167
oral, and systemic disorders, case illustrating connection between, 147
the habitual accompaniment of pyorrhea, 662
the teeth as a focus of, 729
Vincent's, case of, involving mouth, eyes, and penis, 87
Infections, focal, control of, 963
mouth, effect of, upon the general health, 229
Inflammation, persistent, chronic apical, and its treatment, 169
Inglis, Otto E., "A Comparison of Office Policies, with Special Reference to Pulp Exposure or Death," 692
on dentist or stomatologist? 1029
Inlay, the gold, 1106
the porcelain, 1061
wax, technique, 1060
Inlay abutment, 1164
Inlay strengthener, 92
Instruments, cutting, used in the Black system of cavity preparation, 11
root-canal, unsterilized, 635
sterilization of, 636
Inter-Allied Dental Congress [Congrès Dentaire Inter-Alliés] (bibliographical), 525
publication of Transactions of the (editorial), 826
Inter-articular fibro-cartilage of the temporomandibular articulation, 512
Interproximal contact point, the, 839
Iodin, as an antiseptic, 356
trichlorid of, chemical properties of, 908
trichlorid of, precautions in using the 25 per cent. solution of, 909
trichlorid of, preparing the solution, 908
trichlorid of, solubility of, in chlorcosane, 910
trichlorid of, uses of the 1 per cent. solution, 909
trichlorid of, uses of the 1:1000 solution, 910
use of, in tooth socket contra-indicated, 106
Iodo-glycerol, 50, 612
Ionization, 1060
applied to the treatment of facial cicatrices, 632
a practical demonstration of, 891
casting zinc electrode points for, 360
in the treatment of neuralgia, 357
the objection to, 890
Iowa Board of Examiners, 471, 758
Iowa State Dental Society, announcement, 284
Ipecac, alcresta, 87
Ireland, M. W., advancement of, to rank of surgeon-general, 1064
Ivy, R. H., "War Injuries of the Face and Jaws: Collective Review," review of, 1054

Jacket crown, all-porcelain, making the metal die for, 408
Jacket crown, making the matrix for, 408
packing-in the porcelain, 410
shaping and carving the porcelain, 410
Jacket crowns, restorations with, 402
Jackson, Chevalier, and Wm. H. Spencer, "Band of a Gold Crown in the Bronchus: Report of a Case," 905
Janeway, Henry H., "The Treatment of Cancer of the Lip by Radium," review of, 632
Janney, Nelson W., "An Experimental and Clinical Study of the Isolated Thyroid Hormone," 133
Jarvie Fellowship Medal, presentation of, to Geo. H. Wilson (Dental Society of the State of New York), 1016
Jaw, lower, recurrent dislocation of, 1060
Jaw fractures involving extensive loss of substance, cicatricial bands in the treatment of, 316
Jaws, contraction of, oculo-cardiac reflex in cases of, 263
first evidence of, in the sharks, 117
measurement of the force of the, 1058
of man and ape, differences between, 123
of man and the lower animals, evidences of similar conditions in the, 429
treatment of injuries of the, 895
Jaws and teeth, malformations of, 1059
Jawbone, lower, healing of defects in, in war cripples, 172
Jeanselme, E., "The Significance of the Tubercle of Carabelli," review of, 447
Johnson, A. LeRoy, "The Nature of the Orthodontic Problem," 394
on exercises for development of the muscles of the face, 933
Johnson, C. A., "Principles and Practice of Filling Teeth" (bibliographical), 1152
Johnson, Earle E., "Effects of Decayed Teeth upon a Child's Progress in School," 293
Jordon, M. Evangeline, "The First Line Trench in Dentistry," 777

Kansas City Dental College, commencement of, 642
Kansas State Dental Association, announcement, 195
Kassab, A., on education of the public in prophylaxis, 714
Kauffer, H. J., "The Relation of Skin Manifestations to Oral Foci" (clinic), 65
KCNS in tobacco, 267
Kelsey, H. E., on President's Address (Eastern Angle Association), 929
on exercises for development of the muscles of the face, 933
on nature's tolerance and compensating adjustments as they relate to oral restoration, 1139
on primary factors in the etiology of periodontoclasia, 1136
Kells, C. E., "Impacted Lower Third Molars," 101
"Radiolucency of Chloro-percha in the Radiograph" (correspondence), 611
"Replanting *vs.* Apicoectomy," 473
"Technique of Root Amputation" (correspondence), 520
"Topics of the Day: Curetting, Ionization, Pulp Testing," 888
Keniston, Mildred R., and P. R. Howe, "The Salivary Factor in Relation to Dental Caries," review of, 835
Kent, Edwin N., "Dentistry After the War: A Promising Professional Field for Young Men," 806
Kentucky State Dental Association, announcement, 195
Kephalin as a hemostatic, 689

Kessler, S. J., "Sulfuric Acid in Root-canals" correspondence), 918
Keyes, Frederick A., "Army Dentistry (Forsyth Lectures for the Army Dental Reserve Corps)" (bibliographical), 827
King, J. M., "Vincent's Angina: Report of a Case," review of, 1159
Kirk, E. C., "A Dental Anomaly" (Hints), 539
on the clinical phenomena attending pericemental abscesses upon vital teeth, 571, 668
Kolmer, John A., and Edw. Steinfield, "The Disinfection of Pneumococcus-Carriers," review of, 533
Kotts, Fred A., "Casting Zinc Electrode Points for Ionization," 360
Krebs, Adolph, "Disease of the Eye from Focal Infection," review of, 834
Kritchevski, D. S., "Scurvy-like Pyorrhea at the Front" (correspondence), 709
Kritchevsky, B., and P. Séguin, "The Pathogenesis and Treatment of Pyorrhea Alveolaris," 781
Küsel, Geo. C., on care of the mouth during pregnancy, 334

Laboratory, dental, limitations of the, 325
Laboratory Diagnosis, Essentials of (bibliographical), 715
L'Aide Confraternelle, appeal for French dentists made by (see editorial), 81
Honor Roll, 348, 624
Lain, E. S., "Herpes Zoster, A Focal Infection," review of, 86
Lancing of the gums in difficult dentition, 92
Langstroth, Lovell, "The Incidence of Chronic Focal Infection in Chronic Diseases," review of, 354
Lateral teeth, variation in, 1110
Laval University, School of Dental Surgery, commencement of, 744
Law, W. J., "Twelve Months with British Prisoners of War," 950
Lee, Alfred P., on the pathology, etiology, and treatment of pyorrhea, 618
Legal decisions: Cassius M. Carr patent void, 734
Dentists' Mutual Protective Alliance wins in Taggart case, 735
Legislation, dental; provision for the Naval Dental Corps, 733
Legislation, Pending Navy Dental (editorial), 344
Legislation (Proposed) for Navy Dental Corps, (editorial), 166
proposed for the naval dental corps, 272, 365
Leucoplakia of the tongue, 941
Leucoplakia oris, 358
Levy, R. L., "Facial Paralysis Following Pasteur Antirabic Treatment," review of, 91
Lewis, D. N., "The Porcelain Jacket Crown," review of, 260
Lewis, J. M., on "procain for dental operations," 1036
Libraries, dental, some modern, 130
Lieberthal, R. H., "Correct Impression-Taking" (clinic), 65
Lincoln Dental College, commencement of, 740
Lipoids, the, in tumors of the dental system, 831
Literature, Dental Scientific (editorial), 254
Literature, current dental, a brief review of, 301
periodical, need of an index of, 128
Local anesthesia for painless operating, 356
Local anesthetic solutions, to increase efficiency of, 175
Locking devices for two-piece splint, description of, 974
Logan, Geo. F., on educating the public along prophylactic lines, 713
on non-cohesive gold, 713
London, John H., "in memoriam" resolutions, 640
Loose teeth, fixature for securing permanent stability of, in treatment of pyorrhea, 675
"Lord Lister," by Sir Rickman P. Godlee (bibliographical), 445
Loyola University, commencement of, 739
Luckie, S. B., on impression-taking, 251
on non-cohesive gold, 712
on prophylaxis, 712
Lysol, 634

McCall, John O., "Primary Factors in the Etiology of Periodontoclasia," 1084
on crown and bridge work, 1139
McConnell, Guthrie, "General Pathology and Bacteriology for Dental Students" (bibliographical), 715
McCoy, James D., "Dental and Oral Radiography" (bibliographical), 626
McGill University, Department of Dentistry, commencement of, 737
McKay, F. S., "Progress of the Year in the Investigation of Mottled Enamel, with Special Reference to Its Association with Artesian Water," review of, 831
McKinstry, W. H., "A Serological Investigation of Vincent's Angina," review of, 449
McLean, David W., "Asepsis *vs.* Antisepsis in Root-canal Procedure," 491
on the control of focal infections, 1013
Machat, B. B., "Mouth Diagnosis" (clinic), 65
Macroglossia lymphangioma, with report of case, 944
Maine Board of Examiners, 195, 380
Maine dental law providing for dental hygienists, 182
Maine Dental Society, announcement, 379
Maitland, H. B., and H. K. Detweiler, "The Localization of Streptococcus Viridans," review of, 173
Major, R. H., "Multiple Primary Malignant Tumors," review of, 1162
Malformations, maxillo-dental-facial, 1159
Mallett, Stephen W., "Procain for Dental Operations," 966
Malocclusion, early diagnostic signs of, 790
etiology of, 789
importance of diagnosis of causes before attempting treatment, 485
importance of proper muscle function in the correction of, 858
Maltase, tests for, 289
Mandibular movement, teeth do not control, 357
Mandible, anesthesia of, with procain-suprarenin, 969
unilateral hypertrophy of, 633
war fractures of, 629
Manila, dental clinics in, 1115
Manning, Paul R., "Electrobiolytic Theory of Dental Caries," 26
Manson, David, on the influence of general health on oral tissue, 242
president's address (Northeastern Dental Association), 151
Mantoux, C., "The Fifth Cusp and Congenital Syphilis," review of, 447
Marquette Dental Alumni Association, announcement, 194
Marquette University, School of Dentistry, comment of, 849
Marshall, John S., "Persistent Chronic Apical Inflammation and Its Treatment," review of, 169
Maryland Board of Examiners, 379
Maryland State Dental Association, proceedings of, 1130
Massachusetts Board of Examiners, 100, 856

Massachusetts State Dental Society, announcement, 376
Mastication, insufficient, due to frail alveolar bone, 576
thorough, as an economic measure, 93
Matrices for amalgam, 178, 1163
Matrix, a handy, 634
for synthetic fillings in adjoining approximal cavities, 175
Matrix bands, good method for keeping, 452
Mattiossian, H. B., care of the mouth during pregnancy, 335
on plaster *vs.* modeling composition for taking impressions, 251
on the pathology, etiology, and treatment of pyorrhea, 617
Maxfield, Geo. A., on president's address (Northeastern Dental Association), 158
obituary notice of, 947
Maxilla, anesthesia of, with procain-suprarenin, 969
Mayhew, J. M., "Gonococcus Infection of the Mucous Membrane of the Oral Cavity," review of, 534
Mayo, C. H., "The Control of Focal Infections," 963
Medical College of Virginia, College of Dentistry, commencement of, 847
Medical corps instruction extended, 275
Medical enlisted reserve corps, enlistment in, of students of dental schools, 748
Medical ideas on bacteriology and caries (editorial), 1049
Medical schools, continuous sessions in (report of A. M. A. Council on Medical Education), 772
Medicine, the rôle of sepsis and of antisepsis in, 585
Medicine and dentistry, the line of demarcation between, 985
relation of, 982
Meisburger, Louis, "Practical Sterilization for the Dentist," 240
Meningitis, a case of, associated with the presence of bacillus fusiformis, 1160
Meniscus of the mandibular joint, effect of loss of teeth upon the, 509
Mercury stains on gold crowns, to remove, 634
Merritt, A. H., "The Pathology, Etiology, and Treatment of Pyorrhea," 574
Mershon, J. V., on exercises for development of the muscles of the face, 934
on the removal of infected roots of deciduous teeth, 335
Mewborn, Joseph L., obituary of, 361
Meyer, K. F., "The Present Status of Dental Bacteriology," review of, 171
Michigan Board of Examiners, 379, 961
Michigan State Dental Society, announcement, 283
Miner, L. M. S., "The Influence of General Health on Oral Tissue," 234
on the use of local in connection with general anesthesia, 244
Minnesota State Dental Association, announcement, 99
Mississippi Board of Examiners, 195
Mississippi State Dental Association, announcement, 375
proceedings of, 1041
Missouri Board of Examiners, 552, 961
Missouri State Dental Association, announcement, 283
Modeling composition, taking impressions with, 92
Modeling compound, preparation of, for taking impressions, 226
technique of taking impressions with, 226
Models, plaster, 175
Moffat, J. N. C., "Conduction Anesthesia," 1124
Moffitt, R. H., obituary of, 364
Molar, first permanent, importance of saving, 778
rudimentary impacted lower third, report of a case of, 51
Molars, lower third, impacted, 101
Montana Board of Dental Examiners, 99, 554, 961
Montana State Dental Society, announcement, 657
Montgomery, Douglass W., "Leucoplakia of the Tongue," review of, 941
Montgomery, D. W., and G. D. Culver, "Paralysis of the Facialis Caused by Salvarsan," review of, 170
Morestin, "Cartilage Transplantation in Extensive Wounds of the Lower Jaw," review of, 172
Morrison, James Beall, obituary notice of, 269
Mothers, dental treatment for, 453
Mottled enamel, investigation of, with special reference to its association with artesian water, 831
Mottled teeth, notes upon, 631
Moufang, Alphonse N., "A Suggestion for Making Splints in Two Separate Parts and Their Union by Means of a Lock," 972
Mouth, examination of, preparatory to making a plate, 877
gonococcus infection of the mucous membrane in, 534
oldest part of the face, in the course of evolution, 116
preparation of, previous to dental operations, 535
systemic disturbances reflected in the, 234
Mouthwashes, uselessness of, 982
Mozer, M., and C. Chenet, "The Dental Stigmata in Congenital Syphilis," review of, 447
Mucosa of the lip, retention cysts of, 831
Mulcahy, L. L., on "Correspondent's Report" Dental Society of the State of New York), 927
Munger, Carl E., "Tuberculoma of the Tongue," review of, 171
Murlless, F. T., "President's Address" (Eastern Angle Association), 928
on the diagnosis of malocclusion in its early stages, 819
Muscle groups, consideration of the various, 862
Muscle trimming, 179, 227
Muscles of the face, exercises for the development of, 857
of expression, 869
of mastication, 863
Muscular tissue, physiology of, 859

NASAL and palatal restoration, a case of, 131
National Association of Dental Examiners, announcement, 548
National Association of Dental Faculties, announcement, 375
National Association of Industrial Dental Surgeons, announcement, 960
National Dental Association, announcement, 548, 656, 754
National Mouth Hygiene Association, 196
Naval appropriation bill—provision for the Naval Dental Corps, 733
Naval dental reserve corps, examinations for, 750, 1064
Naval dental surgeon, the, at work, 434
Navy dental corps, examination of candidates for, 1064
increase and reorganization of 647
legislation limiting rank of members of, to lieutenant-commander, 750
proposed legislation for, 166, 272, 365, 647
recent legislation concerning (see editorial), 723

Navy Dental Legislation, Pending (editorial), 344
Nebraska Board of Examiners, 553
Needles, hypodermic, to clean, 634
Nephritis, chronic; uremia; severe hemorrhage from gums, 530
Nerve-blocking, 178, 729
Nesbett, Norman B., "A Simple Form of Removable Bridge Work with Cast Clasps," 204
Neuralgia, dental, or pain referred to branches of the fifth nerve, 91
ionization in the treatment of, 357
terminal, a surgeon's impression of, 829
trigeminal, operative treatment of, 940
New, G. B., "Use of Heat and Radium in Treatment of Cancer of the Jaws and Cheeks," review of, 831
New Jersey Board of Registration, 285, 1069
New Jersey, new dental law in, authorizing the establishment of free dental clinics in municipalities, 644
New Jersey State Dental Society, announcement, 285
proceedings of, 54, 1019
New York City, oral hygiene ordinance for, 644
New York College of Dentistry, commencement of, 738
New York State, status of dentistry in, prior to 1868, 793
New Zealand, army dental service in, 952
free dentistry in, 265
Nies, F. H., "A New Continuous-gum Set," review of, 719
Nitrous oxid-oxygen anesthesia, changes produced in the blood by, 633
Nitzschke, Wm. H., "Sterilization of Tooth Tissues with Silver Nitrate" (correspondence), 52
Noma, a case of, following paratyphoid B, 1059
Nomenclature, orthodontic, 267
Non-cohesive gold, 685
Nones, Henry B., obituary notice of, 732
North Carolina Board of Dental Examiners, 99, 1173
North Carolina State Dental Society, announcement, 99, 380
North Dakota Board of Dental Examiners, 100, 554
North Dakota State Dental Association, announcement, 467
Northeastern Dental Association, announcement, 856
proceedings of, 150, 242
Northeastern Massachusetts Dental Society, announcement, 469
Northern Illinois Dental Society, announcement, 960
Northern Ohio Dental Association, announcement, 377
North Pacific College, commencement of, 737
Northwestern University, Dental School, announcement, 284
commencement of, 745
Novocain to be made in America as procain, 264
Nowlin, Nadine, "Endamœba Buccalis: Its Reactions and Food-taking," review of, 262
Noyes, F. B., "A Textbook of Dental Histology and Embryology, Including Laboratory Directions" (bibliographical), 626
Nurses, student, recruiting of, for the army, 748
training of, A. D. Bevan on, 772

O'Brian, Louis A., obituary notice of, 732
Occlusion, anatomical, and articulation, in artificial dentures, 455
importance of, to the health of the mouth, 535
in bridge work, exaggerated importance of, 988
normal, 976
traumatic, 576, 578
Odontological Society of Western Pennsylvania, announcement, 195
Officers, dental reserve, promotion of, 275
Ohio State Dental Society, 1068
Ohio State University, College of Dentistry, commencement of, 736
Oklahoma Board of Examiners, 553, 961
Omaha, Dental Dispensary of, 454
Ontario Dental Society, announcement, 284
Operations, dental, preparation of the mouth for, 535
plastic and dental, two cases illustrating, 172
Operative and prosthetic dental procedures, defective, 1088
Operative dentistry, the past and present of, 884
Oral foci, relation of skin manifestations to, clinic on, 65
Oral hygiene, dietetics and, 840
Oral hygiene ordinance for New York City, 644
Oral infections, effect of, on general health, 229
Oral mutilations, prosthesis for, 841
Oral restoration, nature's tolerance and compensating adjustments as they relate to, 986
success in; what are the fundamental principles upon which it must be based? 785
Oral sanitation, 990
Oral Sepsis (editorial), 621
"Oral sepsis," Wm. Hunter on, 591
"Oral Sepsis in Its Relationship to Systemic Disease," by Wm. W. Duke (bibliographical), 627
Oral surgeon, the, and other specialists, need of co-operation between, 221
Oral tissue, influence of general health on, 234
Orthodontia, a biological problem, 396
bearing of physical anthropology on the problem of, 305
movement of teeth predetermined by engineering instruments, 39
Orthodontic nomenclature, 267
Orthodontic problem, nature of the, 394
Orthodontic treatment of advanced cases, and patients coming from a distance, 45
Orthodonty, evolution of, 417
Osborn, H. F., on the bearing of physical anthropology on the problem of orthodontia, 333
on the evolution of orthodontia, 435
Osborn, Lloyd A., obituary notice of, 948
Osborne, Oliver T., "The Menace of Mouth Infections," review of, 167
Osborne, Weeden Edward (dental surgeon, U. S. navy), heroic death of, 851
Osgood, Ammon, obituary of, 842
Osler on defective teeth, 296
Osteomyelitis, chronic, case illustrating possible relationship of, to oral focus, 147
Ottofy, Louis, "A Case of Tooth Gemination" (correspondence), 807
"Dental Clinics in Manila," 1115
Ottolengui, R., on motor cars for camps, 958
on operative dentistry, 920
Overbite, extensive, pericemental abscesses on vital teeth, the result of, 669

Packing amalgam, technique for, 359
Pain, of devitalized pulp, to relieve, 1162
post-extraction, to relieve, 264
Palatal and nasal restoration, a case of, 131
Palatal surface of vulcanite dentures, to obtain smooth finish on, 838
Palate, cleft, surgical correction of, 581
hard, perforating ulcer of the, resembling tertiary syphilis, but due to a fuso-spirillary invasion, 1160
Paper points in cleaning root-canals, 534
Paraffin treatment of burns, 175, 637
Paralysis, facial, following Pasteur antirabic treatment, 91

Paralysis, facial, in a syphilitic, 1160
of the facialis, caused by salvarsan, 170
Parotitis, experimental, 1160
septic, 172
Pasteur antirabic treatment, facial paralysis following, 91
Patent litigation, decision in: Cassius M. Carr patent void, 734
Dentists' Mutual Protective Alliance wins in Taggart case, 735
Patent Office, Washington—special notice, 855
Patents, dental, monthly record of, 100, 196, 286, 380, 472, 554, 758, 962, 1070, 1174
Paterson, Alexander H., "Careful Technique the Greatest Factor in the Construction of Full Upper and Lower Dentures," 876
Pathology, General, and Bacteriology for Dental Students (bibliographical), 715
Patients coming from a distance, orthodontic treatment of, 45
Pearson, W. H., "President's Address" (Virginia State Dental Association), 1033
Pennsylvania Board of Examiners, 379, 1069
Pennsylvania College of Dental Surgery, dissolution of, notice as to action of the Board of Corporators, 654
Pennsylvania State Dental Society, announcement, 195
Penrose, Clement A., "Some Experiences in the Camps and Fields of the Armies Overseas," 1119
Percy, Nelson M., "Tumor of the Gasserian Ganglion," review of, 941
Pericemental abscesses on vital teeth, nature of, 570
Pericementoclasia, 1090
abnormal systemic conditions an etiological factor of, 1089
pathology of, 1090
various types of, 1089
Periodontal disease, responsibility of the general practitioner in, 1092
Periodontia, chronic microscopic anatomy of, 174
Periodontoclasia, malocclusion as a factor in, 1086
primary tests in the etiology of, 1084
Periosteum, the alveolo-dental, 427
Phenol-sulfonic acid, advantages of, 635
in the treatment of pulpless teeth, 178
Philadelphia Dental College (Temple University), commencement of, 746
Physical examination of registrants in the army, 274
Pickerill, H. P., "Unilateral Hypertrophy of Mandible," review of, 633
Piergili, "Note upon Mottled Teeth," review of, 631
Plaster, to remove from vulcanite dentures, 1163
Plaster bite for bridge work, 1164
Plaster casts, to avoid air-bubbles in, 727
Plaster impression, a good separating medium for, 727
for partial cases, 179
the perfect, 94
Plaster models, 175
to make, 637
Plate, making a, prior to extraction, 635
restoration of abnormal mouths before insertion of, 414
rubber, to refit without vulcanizing, 727
Plates, artificial, reliefs in, 536
clasped, advantages of, 455
finishing, 727
full, retention of, 530
full upper, on a gold base, 453
vulcanite or metal, method of polishing, 838
Plate work—a new continuous-gum set, 719
arrangement of the teeth in, 882
type of denture for army use, 516
Platinized gold backing, substitute for, 176
Platinum, iridium, palladium; Government regulations limiting the sale, possession, and use of these metals and compounds thereof, 1066
rescinding of the Government regulations as to, 1171
Platt, Harry, Geo. G. Campion, and Barron Rodway, "On Bone-grafting in Gunshot Wounds of the Mandible," review of, 632
Platysma myoides, 870
Pneumococcus-carriers, disinfection of, 533
Policies, dental office, compared, with special reference to pulp exposure or death, 692
Polishing material for dentures, 534
Polishing vulcanite or metal plates, method of, 838
Pond, W. R., on president's address (Northeastern Dental Association), 154
on the influence of the general health on oral tissues, 242
Porcelain crown, new method of making, 839
Porcelain inlay, the, 1061
Porcelain jacket crown, 260
fitting of the, 407
Postgraduate Dental Meeting (Ala., Miss., Texas, and La.), 378
Potter, N. B., A. McNeil, and S. Bradbury, "Streptococcus Oral Sepsis: Complement Fixation Test and the Value of Routine Blood Examinations," review of, 450
Practitioner's Medical Dictionary, The, by Geo. M. Gould (bibliographical), 84
Pregnancy, importance of dental supervision during, 314
Prentiss, H. J., "A Preliminary Report upon the Temporo-mandibular Articulation in the Human Type," 505
Preparedness League of American Dentists, announcement, 98, 277, 371, 464, 544, 651, 752, 856, 956, 1062, 1169
Preventive dentistry, 1103
the dentist's safeguard, 230
Price, W. A., and M. M. Brooks, "The Relative Efficiency of Medicaments for the Sterilization of Tooth Structures," review of, 531
Prinz, Hermann, "Clinical Methods of Treating Hypersensitive Dentin," review of, 88
"The Relationship of Oral Secretions to Dental Caries (i) Method of Determining the Amylolytic Index of Human Saliva," 140
(ii) "Conditions Influencing the Quantity and Action of the Amylase Content of Human Saliva," 157
(iii) "Ferments of Human Saliva Other than Amylase," 287
"Sterilization of Root-canals," 1071
"The Technique of Root Amputation," 381, 613
Prinz, Hermann, and W. F. Barry, "Conduction Anesthesia" (clinic), 64
Procain, anesthetic properties of, 966
Procain and novocain identical, 919
Procain-suprarenin tablets, 967
solution prepared from, 968
Professional Appeal, A (editorial), 81 (348, 624)
Proposed Legislation for Navy Dental Corps (editorial), 166
Prosthesis for oral mutilations, 841
type *vs.* temperament in the selection of teeth, 108
Prosthetic dentistry, necessity of more interest in, 223
needs of, 1108
Prosthetics, Dental, Manual of, by G. H. Wilson (bibliographical), 85
Provan, Walter F., "Application of Silver Nitrate Solution in Root-canal Work" (Hints), 1053

Pruritis ani, true; its association with pyorrhea alveolaris, 944
Psi Omega Fraternity, announcement, 194, 549
Psychology of the child, 1164
Ptosis, a case of, as the result of pulpitis, 709
Public health, unclean mouths a menace to, 294
Pulp, resistance of, to operative measures, 987
treatment of active hyperemia of, 177
Pulp chambers of tender or sore teeth, opening the, 534
Pulp devitalization, 492
aseptic precautions in, 1101
contra-indicated, in placing permanent pyorrhea "fixatures," 672
Pulp exposure or death, comparison of office policies, with special reference to, 692
Pulpitis, a case of ptosis as the result of, 709
Pulpless teeth, phenol-sulfonic acid for, 178
preparation of, for jacket crown, 405
the question of retention of, 838
Pulps, use of arsenic for destroying, 176
Pulp testing, 891
Pyorrhea alveolaris, 536
blepharospasm secondary to, 834
causes of, of local origin, 660
clinical alveolar lesions associated with, 759
conditions similar to, the result of gastro-intestinal disorders, 236
diagnosis of, 993
etiological factors in, 575
evolution of, 765
exciting causes of, 577
infection the habitual complication of, 662
kidney infection as a result of, 449
pathogenesis and prophylaxis of, 659, 759
pathogenesis and treatment of, 781
post-operative treatment of, 579
predisposing causes of, 575
prophylaxis of, 767
root surgery in treatment of, 579
surgical treatment of, 993
symptoms of, 660
traumatic causes of, 663
treatment of, 992
treatment of, by intramuscular injections of emetin hydrochlorid, 259
uselessness of vaccines and emetin in the treatment of, 177
Pyorrhea "fixatures," permanent, 672
permanent, avoiding pulp devitalization in placing, 672
permanent, esthetic requirements of, 677
permanent, history of development of, 678
permanent, must fulfil the demands of mouth hygiene, 677
Pyorrhetic teeth, immobilization of, 666

Rabinowitz, Meyer A., "Aberrant Thyroid Tumor of the Tongue," review of, 943
Radiograph, radiolucency of chloro-percha in the, 433, 611
what to expect and what not to expect from the, 454
Radiographs, dental, technique of making, 232
Radiography, Dental and Oral, by J. D. McCoy (bibliographical), 626
Radium, treatment of cancer of the lip by, 632
Radium and heat, use of, in treatment of cancer of the jaws and cheeks, 831
Railliet, G. "The Maxillary Eminence of Sabouraud: Its Clinical Significance," review of, 447
Ratcheff, C. W., "A Case of Tooth Gemination" (correspondence), 330
Raymond, E. H., "A Type of Denture for Army Use," 516
Reconstruction, Dentistry in Relation to (editorial), 1149
Reder, Francis, "Giant-cell Epulis of the Upper Jaw," review of, 528
Register, H. C., on a comparison of office policies, with special reference to pulp exposure or death, 711
on non-cohesive gold, 710
Reinoehl, W. (see obituary notice of Leon Vander-White), 842
Reliefs in artificial dentures, 536
Replantation, tooth, 474, 613
post-operative treatment, 478
prognosis of, 474
some illustrative cases, 480
splint for, 479
technique of the operation, 475
three rare cases of, 261
Replantation and transplantation of teeth, with special reference to the patho-histology of the tissues of attachment, 527
Replanting *vs.* apicoectomy, 473
Re-sterilizing compound, instructions in, 1162
Retter, Arwed, obituary notice of, 540
Rhein, M. L., on the control of focal infections, 1010
Rhode Island Board of Registration, 472, 1069
Rich, Amos C., "President's Address (Dental Society of the State of New York), 809
on Preparedness League of American Dentists, 811
Richmond crowns and bridge work, vulcolox anteriors in, 939
Riethmueller, R. H., on dentist or stomatologist? 1028
Rip Van Winkle, M.D. (editorial), 1049
Roberts, Percy W., "Syphilitic Joint Lesions Simulating Tuberculosis," review of, 447
Robertson, D. E., and W. E. Gallie, "Transplantation of Bone," review of, 533
Robin, Pierre, "Maxillo-facial-dental Malformations," review of, 1159
"Measurement of the Force of the Jaws," review of, 1058
Robinson, W. J., on modeling compound for taking impressions, 251
Rockey, A. E., "Anesthesia and Antiseptics in Plastic Restoration of the Face and Mouth," review of, 942
Rodway, B. J., H. Platt, and Geo. G. Campion, "On Bone-grafting in Gunshot Wounds of the Mandible," review of, 632
Roentgen ray, as an aid in diagnosis, 209
Roentgenograms, interpretation of, 695
Roentgenology, Oral, by Kurt H. Thoma (bibliographical), 84
Rogers, A. P., "Exercises for the Development of the Muscles of the Face, with a View to Increasing Their Functional Activity," 857
on movement of teeth predetermined by engineering instruments, 71
Rogers, Leonard, "Autogenous Oral Streptococcal Vaccines in the Treatment of Seventeen Cases of Sprue," review of, 942
Romanelli, Enzo, "A Case of Noma Following Paratyphoid B," review of, 1059
Root, bad lateral, removing, 1163
Root amputation, 381, 914
anesthetization of parts involved in, 386
incision for, 387
indications for, 381
instrumentarium, 383
operative procedures, 386
post-operative treatment, 388
technique of, 520, 613
Root-canal, materials for filling, 494
technique for filling, a, 495
Root-canal filling, efforts to standardize the operation of, 231
technique of, 1099

Root-canal instruments, unsterilized, 635
Root-canal instrumentarium, 493
Root-canal surgery with and through antiseptics and disinfectants, 538
Root-canal technique, outline for, 537
Root-canal treatment, 893
a specialty, 535
Root-canal work, standardization of, 498
Root-canals, cleansing, 499
cultural methods for determining sterility of, 1094
extent to which they should be filled, 1098
method of filling, 266
obtaining free access to, 498
paper points in cleaning, 534
putrescent, antiseptic precautions in treatment of, 498
refilling after they are cleared, 499
selection of teeth in which they may be successfully filled, 1095
silver nitrate in, 945
sterilization of, 1071
study of reinfection of, after treatment with tricresol-formalin and Peruvian balsam-iodoform, 720
technique for cleaning and filling, 455
when and how shall they be filled? 1093
with putrescent pulps, treatment of, 263
Root-cysts, etiology of, 563
origin of epithelial cells in, 562
pathogenesis of, 174
some rare features of, 564
vascular changes in, 567
Root-end encapsulation, 727
technique of, 729
Root-ends, diseased, histological pathology of, 13
Root-filled teeth, an experimental study of, 450
Root-filling, bismuth salicylate for, 728
chinosol in, 838
Root-fillings, removing, 536
Root resection in granuloma cases, surgical technique of, 266
Root surgery, 838
Rouw, R. Wynne, "Iodo-glycerole" (correspondence), 612
Roy, Maurice, "The Nature of Pericemental Abscesses upon Vital Teeth," 570
"The Pathogenesis and Prophylaxis of Pyorrhea Alveolaris," 659, 759
Royal College of Dental Surgeons, commencement of, 739
Rubber, conversion of, into vulcanite, 800
experiments in vulcanizing, 800
Rubber files, to clean, 175
Rubber plate, to refit, without vulcanizing, 727
Rural dental clinic, equipment for, 293
Ruyl, James P., "Restoration of Abnormal Mouths by Surgical Treatment Before Inserting Plates," 414

Sabouraud, the mammillary eminence of, 447
Sage, F. W., "Self-limiting Action of Sulfuric Acid" (correspondence), 1128
St. Apollonia and her picture in the Nidaros breviary, 87
St. Louis University Dental Department, comment of, 744
Sajous, Louis T. de M., "The Treatment of Hemophilia," review of, 717
Saliva, human, amylolytic index of, 140
human, amylolytic index of, estimating, 146
human, conditions influencing the quantity and action of the amylase content of, 197
human, ferments of other than amylase, 287
human, methods of collecting, 142
human, supposed sugar content of, 291
of the horse, orokinase and ptyalin in, 833
Salivary calculus, 832
Salivary factor, the, in relation to dental caries, 835
Salivary glands, mixed tumors of the, 837
Salvarsan, paralysis of the facialis caused by, 170
Salvas, J. Clarence, "Importance of Dental Supervision During Pregnancy," 314
on the pathology, etiology, and treatment of pyorrhea, 616
Sandpaper, the use of, in the preparation of histologic ground sections of hard substances, 943
Sanz, E. F., "Facial Paralysis in a Syphilitic," review of, 1160
Satterlee, Francis Leroy, obituary notice of, 96
Sausser, E. R., on when and how root-canals should be filled, 1134
Scaling, method of desensitizing teeth that are sensitive to, 634
Schaefer, S. W., "Asepsis and Antisepsis in Modern Dentistry," review of, 1059
School children, importance of caring for the teeth of, 294
teeth of, best method of caring for, 779
School dental clinic at North Tonawanda, N. Y., 840
Scientific Literature, Dental (editorial), 254
Scientific Research, Co-operation in (editorial), 821
Scott, Robert M., "in memoriam" resolutions, 1165
Scurvy-like pyorrhea at "the front," 709
Séguin, P., and B. Kritchevsky, "The Pathogenesis and Treatment of Pyorrhea Alveolaris," 781
Sensitive dentin, 727
Separating disk, safe way of using, 1158
Sepsis in medicine, apparent rôle of, 588
in medicine, actual rôle of, 590
oral, and the anemias, 352
oral, clinical effects of, 595
oral, in its relation to systemic diseases (bibliographical), 627
oral, relationship of, to systemic disease, and its bearing on treatment, 942
oral, specific fevers complicated by, 599
oral, treatment of, 637
oral, ulcerative endocarditis secondary to, treated by autogenous vaccine, 833
Sepsis, Oral (editorial), 621
Septic teeth, etiology and surgical treatment of, 241
Seymour, L. N., "More Anent Standardization" (correspondence), 519
Shearing teeth, evolution of, 420
Shields, J. S., "Apothesin, the New Local Anesthetic: The Revised Technique of Pterygo-mandibular Injection," 298
Shobe, Burford L., obituary notice of, 180
Shoulder crown technique, aid for, 945
Shurly, B. R., "Three Bronchoscopic Cases of Dentists' Origin," review of, 1158
Silicate cement, precautions in the use of, 728
reinforced filling of, 358
spatulation of, 757
Silicate cements, 1106
Silver nitrate, contra-indicated in the treatment of cancer, 776
in root-canals, 945
sterilization of tooth tissues with, 52
Silver nitrate solution in root-canal work, application of, 1053
Silver nitrate stains, to remove, 838
Simpson, F., and R. L. Sutton, "Retention Cysts of the Mucosa of the Lip," review of, 831
Sinusitis, maxillary, caused by conditions of the teeth, 213
Skin disease, focal infection in the etiology of, 836

Skull, correlation of measurements of the different parts of, 309
the modern English, 717
"Slackers" wanting their teeth pulled, 954
Sleight, R. D., and W. Haughey, "Macroglossia Lymphangioma, with Report of Case," review of, 944
Smith, Arthur W., "Root Amputation" (Correspondent's Report, Dental Society of the State of New York), 914
Smith, B. Holly, "The Past and Present of Operative Dentistry," 884
on the needs of prosthetic dentistry, 1131
Smith, Fred M., "in memoriam" resolutions, 364
obituary notice of, 181
Smith, Geo. E., "Amalgam Restorations for Gold Crowns" (Hints), 95
Smith, K. F., "The Practice of Dentistry in the Army and in Civil Life: A Comparison," 504
Snow, Geo. B., "The Conversion of India Rubber into Vulcanite," 800
"Soft" and "hard" teeth, 728
Soldering, crown and bridge, an aid in, 265
Soldering contact points on inlays and crowns, 1059
Soldiers, senility of the dental tissues among, 452
Sollman, Harold, "Comparative Efficiency of Local Anesthetics," review of, 259
Sore teeth, opening pulp chambers in, 534
South Carolina Board of Examiners, 286
South Carolina Dental Association, announcement, 284
South Dakota Board of Dental Examiners, 100, 472
Spacing between natural and artificial teeth, 726
Spatulation of silicate cement, 727
Specialization in dentistry, 895
Spencer, Wm. H., and Chevalier Jackson, "Band of a Gold Crown in the Bronchus: Report of a Case," 905
Sphagnum moss as a surgical dressing, 945
Spier, Leslie, "Physiological Age: The Relation of Dentition to Body Growth, 899
Splint, cementing the, in treatment of fractured jaws, 608
technique for removal of, 608
technique of making, 604
two-piece, advantages of, 975
two-piece, description of the locking device for, 974
two-piece, technique of making, 972
Sprue, autogenous oral streptococci vaccine in the treatment of, 942
Squire, D. H., on "Report of Committee on Practice" (Dental Society of the State of New York), 923
Stains, blood, to remove, 356
mercury, to remove from gold crowns, 634
silver nitrate, to remove, 838
Standardization, More Anent (correspondence), 519
Stanley, R. B., on President's Address (Eastern Angle Association), 929
Stanton, F. L., "Engineering Principles Applied to Dentistry," 336
"Movement of Teeth Predetermined by Engineering Instruments," 39
on the diagnosis of malocclusion in its early stages, 818
Starch molecule, cleavage of the, 141
Status Præsens, The (editorial); recent legislation on the naval dental corps, 723
Steel instruments, broken-off, dissolving (in 25 per cent, aqueous solution of trichlorid of iodin), 909
Steinfield, Edw., and John H. Kolmer, "The Disinfection of Pneumococcus-Carriers," review of, 533
Stellwagen, Thomas Cook, obituary notice of, 731
Stenographers and typists wanted—men and women—by the U. S. Government, special notice, 192, 959
Stereoscopy, sinus and tooth radiography, clinic on, 65
Sterilization, alcohol, 529
classification of instruments for, 36
of dentin, 727
of instruments, 636
of instruments, negligence in, charged in blood-poisoning case, 645
of local anesthetics, 945
of tooth structures, relative efficiency of medicaments for, 531
practical, for the dentist, 240
Stieglitz, Julius, "Procain and Novocain Identical" (correspondence), 919
Stillman, Paul R., "Report of the Committee on Practice" (Dental Society of the State of New York), 893
"Traumatism Due to Faulty Co-ordinating Bridge Work, 321
on pyorrhea, 614
Stilson, Ira B., on engineering principles applied to dentistry, 340
on removable bridge work with cast clasps, 246
Stomatitis, mercurial, its pathogenesis, prophylaxis, and treatment, 86
ulcerative, associated with Vincent's organisms, 542
Strang, C. W., on president's address (Northeastern Dental Association), 156
Streptococcus oral sepsis; complement-fixation test and value of routine blood examinations, 450
Streptococcus viridans, localization of, 173
Streptothrix interproximalis (new species), an obligate micro-aerophile from the human mouth, 940
Students, dental, conservation of time in teaching, 772
Stump of bicuspid or molar, preparing, for a crown, 535
Sturridge, Ernest, "Dental Electro-Therapeutics" (bibliographical), 827
Subsection of Plastic and Oral Surgery, announcement of, 125
Sulfuric acid in root-canals, 918, 1127
self-limiting action of, 1128
Sullivan, L. R., "The Bearing of Physical Anthropology on the Problems of Orthodontia," 305
on healthy and diseased conditions of the alveolar processes of the jaws, 438
on "taurodontism," 438
Summa, Richard, "The Importance of the Interarticular Fibro-cartilage of the Temporomandibular Articulation," 512
Supplee, Samuel G., "Classification of Tissue Conditions in the Mouth as Related to Efficient Dentures," 996
Surgical dressing, sphagnum moss as a, 945
Surgical practice, modern, 105
Surgeon and dentist, relation of, in face and jaw injuries, 220
"Surgery and Diseases of the Mouth and Jaws," by V. P. Blair, review of, 257
Surgery, plastic and oral, aims of the Subsection of, 125
Susquehanna Dental Association of Pennsylvania, announcement, 856
Sutton, R. L., and F. Simpson, "Retention Cysts of the Mucosa of the Lip," review of, 831
Swaging saddles, die and counter-die for, 634
Synthetic technique, 946

Syphilis, congenital, an alleged dental stigma of, 447
congenital, dental stigmata in, 447
congenital, significance of changes in the first permanent molar in diagnosis of, 170
congenital, the fifth cusp and, 447
heredo-syphilis nerviosa, a new case of, 447
primary, of the gums, 529
Syphilitic joint lesions simulating tuberculosis, 447
Systemic conditions and the teeth, 501, 981
Systemic disease, relation of nasal and oral sepsis to, 1003
Systemic diseases and pyorrhea, connection between, 576

TAGGART case, Dentists' Mutual Protective Alliance wins in, 735
Talbot, Eugene S., "Conservation of Time in Teaching Dental Students," 772
"Iodo-glycerole," 50
Talley, F. R., on procain for dental operations, 1038
Taste fibers, presence of, in the lingual nerve, 217
Taylor, B. L., on primary factors in the etiology of periodontoclasia, 1137
on the filling of root-canals, 1135
Taylor, F. E., and W. H. McKinstry, "A Serological Investigation of Vincent's Angina," review of, 449
Taylor, H. D., and J. H. Austin, "Toxicity of Certain Widely Used Antiseptics," review of, 722
Teeth, natural and artificial, spacing between, 726
three basal types of, 1108
variation in size of, in the same jaw, 728
Tempering small tools, 265
Temporo-mandibular articulation, anatomy of, 509
importance of the inter-articular fibro-cartilage of, 512
in the human type, 505
Temporo-maxillary joint, loose cartilage in the, 865
Tennessee Board of Examiners, 553
Tennessee State Dental Association, announcement, 377
Texas Board of Examiners, 470
Texas Dental College, commencement of, 643
Texas State Dental Society, announcement, 194
Thoma, Kurt H., "Oral Roentgenology" (bibliographical), 84
"Selection of Anesthesia for Oral Surgical Operations, and the Roentgen Ray as an Aid in Diagnosis," 209
"The Histological Pathology of Alveolar Abscesses and Diseased Root-ends," 13
Thomas W. Evans Museum and Dental Institute School of Dentistry University of Pennsylvania, commencement of, 742
Thompson, H. M., "Blepharospasm Secondary to Pyorrhea Alveolaris," review of, 834
Thomson, St. Clair, "Tooth Impacted in a Secondary Bronchus of the Left Lung: Removal by Lower Bronchoscopy," review of, 1158
Thromboplastin, use of, in treatment of hemorrhage, 689
Thyroid hormone, an experimental and clinical study of, 133
effect of, on the nitrogen balance, 136
effect of, on pathologic conditions, 136
isolation of, 134
toxic action of, 134
Thyroid preparations, the nitrogen balance as a gage of the effect of, 135
Timerman, L. A., on "Correspondent's Report" (Dental Society of the State of New York), 925
Tissue conditions in the mouth, classification of, as related to efficient dentures, 996
Tissues, alveolo-dental, precocious senility of, 762
Tobacco, KCNS in, 267
Tongue, congenital angioma of the, a case of, 169
fibroma and other tumors of the, 837
tuberculoma of the, 171
Toothbrush, care of the, 730
inefficient use of, localized malnutrition due to, 576
use of the, 357
Tooth-brushing, proper method of, 580
Tooth replantation, 474
Tracy, W. D., "The Next Quarter Century in Dentistry," 1102
Transplantation, cartilage, in extensive wounds of the lower jaw, 172
Trauma, dental periclasia the result of, 323
Tray, individual, for impression taking, 877
trimming the, 878
Tricresol-formalin and Peruvian balsam-iodoform, study of the reinfection of root-canals after treatment with, 720
Trigeminal neuralgia, a surgeon's impression of, 829
Trocar, a dental, 1154
Tulane University, School of Dentistry, commencement of, 844
Tumor, aberrant thyroid, of the tongue, 943
of the Gasserian ganglion, 941
Tumors, mixed, of the salivary glands, 837
multiple primary malignant, 1162
of the dental system, lipoids in, 831
of the gums, 528
Turnbull, J. A., "Anaphylaxis in Connection with Asthma, Hay Fever, and Various Skin Diseases," 1112
Type, development of the individual not controlled by the biologic factor which determines, 311
development of, influence of environment on the, 306
development of, race the controlling factor in, 307
vs. temperament in the selection of teeth, 108

ULCER, perforating, of the hard palate, 1160
University of Buffalo, College of Dentistry, commencement of, 849
University of California, College of Dentistry, commencement of, 844
University of Illinois, College of Dentistry, commencement of, 845
University of Iowa, College of Dentistry, announcement of dedication of new building, 99
commencement of, 949
University of Maryland, Dental Department, commencement of, 848
University of Michigan, College of Dental Surgery, commencement of, 848
University of Minnesota, College of Dentistry, commencement of, 847
University of Pittsburgh, School of Dentistry, commencement of, 641
University of Southern California, College of Dentistry, commencement of, 847
U. S. Army Dental Corps, on the, 894
Utah State Dental Society, announcement, 549

VACCINES and emetin, uselessness of, in the treatment of pyorrhea, 177
Vanderbilt University, School of Dentistry, commencement of, 642

VanderWhite, Leon, obituary of, 842
Vaughan, Harold S., "Oral Anesthesia," 238
Vermont Board of Examiners, 533
Vermont State Dental Society, announcement, 194
Veronal, to be made in America as Barbital, 264
Vincent's angina, 355
a case of, 1159
among the troops in France, 750
a serological investigation of, 449
frequency of, 941
from the oral surgical standpoint, 296
Vincent's infection, a case of, involving mouth, eyes, and penis, 87
Vincent's organisms, ulcerative stomatitis associated with, 542
Virginia State Dental Association, announcement, 99
proceedings of, 1033
Vocational education, federal, 952
Vulcanite, conversion of rubber into, 800
expansion and contraction of, 804
spongy, 805
Vulcanite denture, tooth replacement in, 535
Vulcanite dentures, removing plaster from, 1163
to obtain smooth finish on palatal surface of, 838
Vulcolox anteriors in the construction of Richmond crowns and bridge work, 939

WAAS, M. J., "Indirect-Direct Gold Inlay Method," 328
"Standardization of Root-canal Work," 498
"Sulfuric Acid in Root-canals" (correspondence), 1127
"Trichlorid of Iodin in Dentistry," 908
Wade, R., "Methods of General Anesthesia in Facial Surgery," review of, 942
Wade, Thomas B., "Interpretation of Roentgenograms," 695
Wadsworth, Henry P., "A Case of Ptomain as the Result of Pulpitis" (correspondence), 709
Walker, A. S., on "Correspondent's Report" (Dental Society of the State of New York), 924
Wall, J. S., "Significance of Dental Stigmata," review of, 170
War the, and the dental profession, 810
its influence on dentistry and dental colleges, 1001
War and Dentistry: Teaching Oral Hygiene to French Children (illustration), 955
War cripples, healing of lower jaw-bone defects in, 172
War fractures of the mandible, non-union of, 629
"War Injuries of the Face and Jaws: Collective Review," review of, 1054
War prisoners, British, twelve months with, 950
War surgery, 1025
Washington Board of Examiners, 471, 1069
Washington State Dental Society, announcement, 470
Washington University, Dental Department, commencement of, 741
Watt's metal plates, to get the best results in casting, with porcelain teeth, 265
Waugh, Leuman M., "The Technique of Making Dental Radiographs," 232
on report of Committee on Practice (Dental Society of the State of New York), 921
Wax inlay technique, 1060
Weinberger, B. W., on President's Address (Eastern Angle Association), 930
Wessler, John, "St Apollonia and Her Picture in the Nidaros Breviary," review of, 87
Western Dental College, commencement of, 745
Western Fairfield Co. (Conn.), Dental Society, announcement, 285
Western Reserve University, Dental School, commencement of, 746
Weston, Wm. H., on iodin for gum sterilization before using novocain, 245
Whartonitis, acute suppurative, 832
Wheeler, Herbert L., "The Relation of the Surgeon and the Dentist in Face and Jaw Injuries," 220
Wilkinson, F. C., "Some Observations on the Replantation and Transplantation of Teeth, with Special Reference to the Patho-histology of the Tissues of Attachment," review of, 527
Willett, E. W., "The Naval Dental Surgeon at Work" (correspondence), 434
Williams, Percy N., "An Original Method of Outlining the Arch for Orthodontic Procedures" (clinic), 64
"Dental Engineering and the Normal Arch," 483
Wilson, G. E., "Impressions for Full Dentures, and a Technique," review of, 168
Wilson, G. H., "A Manual of Dental Prosthetics" (bibliographical), 85
Winter (Geo. B.), Exodontia Club, announcement, 758
Wiring corresponding teeth of superior and inferior maxillæ in fracture of inferior maxilla, 261
Wisconsin Board of Examiners, 471
Wollstein, Martha, "Experimental Parotitis," review of, 1160
Woolverton, J. I., "President's Address" (New Jersey State Dental Society), 55
Worster-Drought, Cecil, "A Case of Meningitis Associated with the Presence of Bacillus Fusiformis," review of, 1160
Wounds, gunshot, of the mandible and maxilla, treatment of, 172
of the lower jaw, extensive, cartilage transplantation in, 172
of the soft parts, treatment of, 127
Wright, G. H., "Anaphylaxis in Connection with Asthma, Hay Fever, and Various Skin Diseases," 1143
Wright, T. B., "President's Address" (Mississippi Dental Association), 1041
Wright, Wm. H., obituary of, 1165
Wyckoff, W. T., on dentist or stomatologist? 1027

X-RAY, the, as an aid in diagnosis, 209, 231
as an aid in root-canal operations, 500
X-ray diagnosis, should it supplement or supersede the clinical? 265
X-ray film, dark areas in the, 193
X-ray pictures, dental, technique of making, 232
interpretation of, 695
what to expect and what not to expect from, 454

YOUNG, J. LOWE, on movement of teeth predetermined by engineering instruments, 69
on orthodontic treatment of advanced cases, and patients coming from a distance, 66

ZENTLER, ARTHUR, on dentist or stomatologist? 1028
Zinc chlorid, deliquesced, use of, to maintain dryness of gingival cavity without rubber dam in using silicious cements, 841
Zinc dies with zinc counters, 452
Zirkle, Wm. Mortimer, obituary notice of, 457

Subject Index for January 1918.

Abscess, acute alveolar, 13
effect of, on the root-ends, 25
l'Aide Confraternelle, appeal for French dentists made by (see editorial), 81
Alcresta ipecac, 87
Amalgam restorations for gold crowns, 95
American Institute of Dental Teachers, 99
Anesthesia, conduction, clinic on, 64
Anesthetic, new local—apothesine, 92
Aneurysms of the arteries of the head and neck, 88
Antiseptics of the chlorin group and acriflavin and other dyes, relative germicidal efficiency of, 91
Apothesine, the new local anesthetic, 92
Arch, original method of outlining, for orthodontic procedure, clinic on, 64
Army and navy dental news, 97
Asepsis, logical, in dental practice, 31
Ash, C. F., on logical asepsis in dental practice, 77

Barnhard, Wm. H., "Dentistry as a Career" (correspondence), 53
Beeswax, using, 91
Black's cavity preparation, principles of, 1
Bowman, F. B., "A Case of Vincent's Infection Involving the Mouth, Eyes, and Penis," review of, 87
Byrnes, R. R., "The Principles of Black's Cavity Preparation," 1

Callahan, J. R., "Logical Asepsis in Dental Practice," 31
Caries, electrolytic theory of, 26
Cavities, preparation of, by classes, 6
Cavity preparation, Black's principles of, 1
extension of margins for the prevention of recurrent decay, 3
seven steps in, 4
Chewing, thorough, as an economic measure, 93
Chicago Dental Society, 99
Clarke, F. B., "in memoriam" resolutions, 96
Connecticut State Dental Association, 99
Cooke, A. R., on logical asepsis in dental practice, 76

Dakin, H. D., and E. K. Dunham, "The Relative Germicidal Efficiency of Antiseptics of the Chlorin Group and Acriflavin and Other Dyes," review of, 91
Dental practice, logical asepsis in, 31
Dental Society of the State of New York, proceedings of, 73
presentation of Fellowship medal to J. R. Callahan, 73
Dentin, hypersensitive, clinical methods of treating, 88
Dentistry as a career, 53
Dentition, difficult, lancing the gums in, 92
Dentures, unclean yet sound, 52
Diagnosis, mouth, clinic on, 65
Discussion on "Logical Asepsis in Dental Practice," 76
on Movement of Teeth Predetermined by Engineering Instruments: Appliances Designed in Accordance with Analytical Mechanics," 69

Discussion on "Orthodontic Treatment of Advanced Cases, and Patients Coming from a Distance," 66

Eastern Association of Graduates of the Angle School of Orthodontia, proceedings of, 66

Electro-activity in the mouth, evidence of, 26

Electrolysis in the mouth, factors in the institution or modification of, 27

possible course of the process of electrolysis in the mouth, 28

Enamel rods, inclination of, 1

Engineering instruments, movement of teeth predetermined by, 39

Favre, M., "Mercurial Stomatitis: Its Pathogenesis, Prophylaxis, and Treatment," review of, 36

Feldman, Harry J., "A Dental Anomaly: Report of a Case of a Rudimentary Impacted Lower Third Molar," 51

Fifth nerve, dental neuralgia or pain referred to branches of, 91

Film, X-ray, dark areas in the, 93

French dentists, appeal for aid for (see editorial), 81

Gould, Geo. M., "The Practitioner's Medical Dictionary" (bibliographical), 84

Graham, F. A., "Unclean Yet Sound Dentures" (correspondence), 52

Granulomata, dental, 14

Grieve, G. W., on orthodontic treatment of advanced cases, 67

Hawley, C. A., on orthodontic treatment of advanced cases, 67

Hellman, Milo, on movement of teeth predetermined by engineering instruments, 69

Herdling, A. C. M., "Stereoscopy, Sinus and Tooth Radiography" (clinic), 65

Herpes zoster, a focal infection, 36

Hoggan, J. A. C., "Orthodontic Treatment of Advanced Cases, and Patients Coming from a Distance," 45

Hollbaek-Hanssen, "Aneurysms of the Arteries of the Head and Neck," review of, 88

Hutchinson's teeth, 92

Idaho Board of Dental Examiners, 100

Impacted lower third molar, rudimentary; report of case of, 51

Impression, the perfect plaster, 94

Impression-taking, clinic on, 65

Impressions, full upper or lower, formulary for, 93

taking, with modeling composition, 92

Infection, Vincent's, case of, involving mouth, eyes, and penis, 87

Inlay strengthener, 92

Instruments, cutting, used in the Black system of cavity preparation, 11

Iodo-glycerole, 50

Ipecac, alcresta, 87

l'Aide Confraternelle, appeal for French dentists made by (see editorial), 81

Lain, E. S., "Herpes Zoster, a Focal Infection," review of, 36

Lancing of the gums in difficult dentition, 92

Levy, R. L., "Facial Paralysis Following Pasteur Antirabic Treatment," review of, 91

Lieberthal, R. H., "Correct Impression-Taking" (clinic), 65

Machat, B. B., "Mouth Diagnosis" (clinic), 65

Manning, Paul R., "Electrobiolytic Theory of Dental Caries," 26
Massachusetts Board of Dental Examiners, 100
Mastication, thorough, as an economic measure, 93
Minnesota State Dental Association, 99
Modeling composition, taking impressions with, 92
Molar, rudimentary impacted lower third, report of a case of, 51
Montana Board of Dental Examiners, 99

NEURALGIA, dental, or pain referred to branches of the fifth nerve, 91
New Jersey State Dental Society, proceedings of, 54
  address of welcome, 54
  president's address, 55
Nitzschke, Wm. H., "Sterilization of Tooth Tissues with Silver Nitrate" (correspondence), 52
North Carolina Board of Dental Examiners, 99
North Carolina State Dental Society, 99
North Dakota Board of Dental Examiners, 100

ORAL foci, relation of skin manifestations to, clinic on, 65
Orthodontia—movement of teeth predetermined by engineering instruments, 39
Orthodontic treatment of advanced cases, and patients coming from a distance, 45

PARALYSIS, facial, following Pasteur antirabic treatment, 91
Pasteur antirabic treatment, facial paralysis following, 91
Patents, dental, monthly record of, 100
Patients coming from a distance, orthodontic treatment of, 45
Plaster impression, the perfect, 94
Practitioner's Medical Dictionary, The, by Geo. M. Gould (bibliographical), 84
Preparedness League of American Dentists, 98
Prinz, Hermann, "Clinical Methods of Treating Hypersensitive Dentin," review of, 88
Prinz, Hermann, and W. F. Barry, "Conduction Anesthesia" (clinic), 64
Professional Appeal, A (editorial), 81
Prosthetics, Dental, Manual of, by G. H. Wilson (bibliographical), 85

ROENTGENOLOGY, Oral, by Kurt H. Thoma (bibliographical), 84
Rogers, A. P., on movement of teeth predetermined by engineering instruments, 69
Root-ends, diseased, histological pathology of, 13

ST. APOLLONIA and her picture in the Nidaros breviary, 87
Satterlee, Francis Leroy, obituary notice of, 96
Silver nitrate, sterilization of tooth tissues with, 52
Smith, Geo. E., "Amalgam Restorations for Gold Crowns" (Hints), 95
South Dakota Board of Dental Examiners, 100
Stanton, F. L., "Movement of Teeth Predetermined by Engineering Instruments," 39
Stereoscopy, sinus and tooth radiography, clinic on, 65
Sterilization, classification of instruments for, 36

Stomatitis, mercurial, its pathogenesis, prophylaxis, and treatment, 36

TALBOT, EUGENE S., "Iodo-glycerole," 50

Thoma, Kurt H., "Oral Roentgenology" (bibliographical), 84

"The Histological Pathology of Alveolar Abscesses and Diseased Root-ends," 13

UNIVERSITY of Iowa, College of Dentistry, 99

VINCENT'S infection, a case of, involving mouth, eyes, and penis, 87

Virginia State Dental Association, 99

WESSLER, JOHN, "St. Apollonia and Her Picture in the Nidaros Breviary," review of, 87

Williams, P. N., "An Original Method of Outlining the Arch for Orthodontic Procedure" (clinic), 64

Wilson, G. H., "A Manual of Dental Prosthetics" (bibliographical), 85

Woolverton, J. I., "President's Address" (New Jersey State Dental Society), 55

X-RAY film, dark areas in the, 93

YOUNG, J. LOWE, on movement of teeth predetermined by engineering instruments, 69

on orthodontic treatment of advanced cases, and patients coming from a distance, 66

Subject Index for February 1918.

Abscessed teeth, use of Dakin's solution for, 176
Amalgam, matrices for, 178
Amalgam carrier, an, 176
Ambrine, 175
Anesthetic, local, solutions, to increase efficiency of, 175
  why chloroform is more powerful and dangerous than ether, 170
Angioma of the tongue, congenital, a case of, 169
Anomalies, occlusal, functional inefficiencies of the teeth associated with, 168
Anthony, L. P., "Dental Bibliography: The Need of an Index of Periodical Literature," 128
Apical inflammation, chronic, and its treatment, 169
Army (English); dental treatment in the, 186
Arsenic, use of, for destroying pulps, 176
Artificial teeth, type *vs.* temperament in selection of, 108
Army and Navy Dental News, 183

Backing, platinized gold, substitute for, 176
Bacteriology, dental, present status of, 171
Barrett, T. J., on president's address (Northeastern Dental Association), 156
Bartleman, F. C., "Dental Service in France" (correspondence), 148
Bell, Geo. C., "A Case of Nasal and Palatal Restoration," 131
Bibliography, dental; need of an index of periodical literature, 128
Blair, V. P., "Septic Parotitis," review of, 172
  "The Aims of the Subsection of Plastic and Oral Surgery," 125
Bone regeneration in the adult, 168
Burns, paraffin treatment of, 175
Burge, W. E., "Why Chloroform is a More Powerful and Dangerous Anesthetic than Ether," review of, 170

Caries, relationship of oral secretions to, 140
  studies on, 173
Carrier for amalgam, 176
Chloroform, why it is a more powerful and dangerous anesthetic than ether, 170
Chin, evolution of, 123
Connecticut State Dental Association, 194
Cretinism, 137
Crowns and fillings, faulty, bad results of patching, 175
Culver, G. D., and D. W. Montgomery, "Paralysis of the Facialis Caused by Salvarsan," review of, 170

Dakin's solution for abscessed teeth, use of, 176
David, John W., death of, 181
Dentist and surgeon, co-operation between, necessary in present world war, 126
Dentistry twenty years ago and today, 179
Dentures, full, impressions for, 168
Detweiler, H. K., and H. B. Maitland, "The Localization of Streptococcus Viridans," review of, 173
Discussion on "An Experimental and Clinical Study of the Isolated Thyroid Hormone," 159
  on President's Address (Northeastern Dental Association), 154

Eastern Association of Graduates of the Angle School of Orthodontia, proceedings of, 159

Endocrine function, Janney's hypothesis of, 138
Esser, J. F. S., "Healing of Lower Jawbone Defects in War Cripples," review of, 172
Essig, Norman S., "Type *vs.* Temperament in the Selection of Teeth" (IV), 108
Extraction wounds, nature's method of caring for, 105

Face, human, evolution of, 115
of vertebrates, first presented in its typical form in the shark, 116
Facial muscles of mammals, clue to origin of, 118
Feldman, M. H., "Possible Relationship of Oral Focus to Chronic Osteomyelitis. (A Case Report), 147
Ferments, general definition of, 140
terminology of, 141
Files, rubber, to clean, 175
Fillings, gold foil, for restoring tooth form, 177
gold, indications for, 176
synthetic, in adjoining approximal cavities, matrix for, 175
Fillings and crowns, faulty, folly of patching, 175
Forceps, special, for extracting impacted lower third molars, 103
Forsyth Dental Infirmary, 196
France, dental service in, 148
Fry, W. K., "A Few Notes on the Treatment of Gunshot Wounds of the Mandible and Maxilla," review of, 172

Gillette, Helen H., and Percy R. Howe, "Studies upon Dental Caries," review of, 173
Gillies, H. D., "Two Cases Illustrating Plastic and Dental Operations," review of, 172
Gold fillings, indications for, 176
Gold foil fillings for restoring tooth form, 177
Graves' disease, theories concerning the pathogenesis of, 137
Green, Jesse Cope, editorial on, 163
Gregory, Wm. K., "Evolution of the Human Face: Chief Stages in Its Development from the Lowest Forms of Life to Man," 115
a study of the isolated thyroid hormone, 160
Gunshot wounds of the mandible and maxilla, treatment of, 172

Hartzell, T. B., and A. T. Henrici, "The Microscopic Anatomy of Chronic Periodontitis and the Pathogenesis of Dental Root-cysts," review of, 174
Heitz and Scheikevitch, "Regeneration of Bone in the Adult," review of, 168
Hellman, Milo, "A Study of Some Functional Inefficiencies of the Teeth Associated with Occlusal Anomalies," review of, 168
on a study of the isolated thyroid hormone, 159
Henrici, A. T., and T. B. Hartzell, "The Microscopic Anatomy of Chronic Periodontitis and the Pathogenesis of Dental Root-cysts," review of, 174
Hollenback, Reuben, obituary notice of, 180
Howe, Percy R., and Helen H. Gillette, "Studies Upon Dental Caries," review of, 173
Hughes, Frank M., "A Case of Congenital Angioma of the Tongue," review of, 169
Hygienists, dental, Maine law providing for, 182
Hyperemia, active, of the pulp, treatment of, 177

Impression, a help in taking an, 175
Impressions for full dentures, 168
plaster, of partial cases, 179
Indexes, dental, various, 128
Infection, menace of, 167
oral, and systemic disorders, case illustrating connection between, 147

Inflammation, persistent chronic apical, and its treatment, 169
Iodin, use of, in tooth socket contra-indicated, 106

JANNEY, NELSON W., "An Experimental and Clinical Study of the Isolated Thyroid Hormone," 133
Jaws, first evidence of, in the shark, 117
of man and ape, differences between, 123
Jawbone, lower, healing of defects in, in war cripples, 172

KANSAS State Dental Association, 195
Kells, C. E., "Impacted Lower Third Molars," 101
Kentucky State Dental Association, 195

LIBRARIES, dental, some modern, 130
Legislation (Proposed) for Navy Dental Corps (editorial), 166
Literature, periodical, need of an index of, 128
Local anesthetic solutions, to increase efficiency of, 175

MAINE Board of Examiners, 195
Maine dental law providing for dental hygienists, 182
Maitland, H. B., and H. K. Detweiler, "The Localization of Streptococcus Viridans," review of, 173
Manson, David, president's address (Northeastern Dental Association), 151
Marquette Dental Alumni Association, 194
Marshall, John S., "Persistent Chronic Apical Inflammation and Its Treatment," review of, 169
Massachusetts Board of Examiners, 195
Matrices for amalgam, 178
Matrix for synthetic fillings in adjoining approximal cavities, 175
Maxfield, Geo. A., on president's address (Northeastern Dental Association), 158
Meyer, K. F., "The Present Status of Dental Bacteriology," review of, 171
Minnesota State Dental Association, 194
Mississippi Board of Examiners, 195
Models, plaster, 175
Molars, lower third, impacted, 101
Montgomery, D. W., and G. D. Culver, "Paralysis of the Facialis Caused by Salvarsan," review of, 170
Morestin, "Cartilage Transplantation in Extensive Wounds of the Lower Jaw," review of, 172
Mouth, oldest part of the face, in the course of evolution, 116
Munger, Carl E., "Tuberculoma of the Tongue," review of, 171
Muscle trimming, 179

NASAL and palatal restoration, a case of, 131
National Mouth Hygiene Association, 196
Navy Dental Corps, proposed legislation for, 166
Nerve blocking, 178
North Carolina Dental Society, 195
Northeastern Dental Association, proceedings of, 150
president's address, 151

ODONTOLOGICAL Society of Western Pennsylvania, 195
Operations, plastic and dental, two cases illustrating, 172
Osborne, Oliver T., "The Menace of Mouth Infections," review of, 167
Osteomyelitis, chronic, case illustrating possible relationship of to oral focus, 147

PALATAL and nasal restoration, a case of, 131
Paraffin treatment of burns, 175
Paralysis of the facialis caused by salvarsan, 170
Parotitis, septic, 172
Patents, dental, monthly record of, 196
Pennsylvania State Dental Society, 195

Periodontitis, chronic, microscopic anatomy of, 174
Phenol-sulfonic acid in the treatment of pulpless teeth, 178
Plaster impressions of "partial" cases, 179
Plaster models, 175
Platinized gold backing, substitute for, 176
Pond, W. R., on president's address (Northeastern Dental Association), 154
Preparedness League of American Dentists, 193
Prinz, Hermann, "The Relationship of Oral Secretions to Dental Caries," 140
Proposed Legislation for Navy Dental Corps (editorial), 166
Prosthesis, type *vs.* temperament in the selection of teeth, 108
Psi Omega Fraternity, 194
Pulp, treatment of active hyperemia of, 177
Pulpless teeth, phenol-sulfonic acid in the treatment of, 178
Pulps, use of arsenic for destroying, 176
Pyorrhea, uselessness of vaccines and emetin in the treatment of, 177

Root-cysts, pathogenesis of, 174
Rubber files, to clean, 175

Saliva, human, amylolytic index of, 140
human, amylolytic index of, estimating, 146
human, amylolytic index of, technique of determining, 145
human, methods of collecting, 142
Salvarsan, paralysis of the facialis caused by, 170
Shobe, Burford L., obituary notice of, 180
Smith, Fred M., obituary notice of, 181
Stenographers and typists wanted—men and women—by the U. S. Government, 192
Starch molecule, cleavage of the, 141
Strang, C. W., on president's address (Northeastern Dental Association), 156
Streptococcus viridans, localization of, 173
Subsection of Plastic and Oral Surgery, aims of, 125
Surgical practice, modern, 105
Surgery, plastic and oral, aims of the subsection of, 125
Syphilis, congenital, significance of changes in the first permanent molar in diagnosis of, 170

Texas State Dental Society, 195
Thyroid hormone, an experimental and clinical study of, 133
effect of, on the nitrogen balance, 136
effect of, on pathologic conditions, 136
isolation of, 134
toxic action of, 134
Thyroid preparations, the nitrogen balance as a gage of the effect of, 135
Tongue, tuberculoma of the, 171
congenital angioma of the, a case of, 169
Transplantation, cartilage, in extensive wounds of the lower jaw, 172
Type *vs.* temperament in the selection of teeth, 108

University of Iowa, College of Dentistry, 194

Vaccines and emetin, uselessness of, in the treatment of pyorrhea, 177
Vermont State Dental Society, 194
Virginia State Dental Association, 194

Wall, J. S., "Significance of Dental Stigmata," review of, 170
War cripples, healing of lower jawbone defects in, 172
Wilson, G. E., "Impressions for Full Dentures, and a Technique," review of, 168
Wounds, gunshot, of the mandible and maxilla, treatment of, 172
of the lower jaw, extensive, cartilage transplantation in, 172
of the soft parts, treatment of, 127

Subject Index for March 1918.

Abscesses, blind, 212
Academy of Stomatology, proceedings of, 250
Accidents from local anesthetics, reporting of, 282
After-pain in extraction, to avoid, 266
Anesthesia, oral, 238
  oral, infiltration, 239
  oral, local, contra-indications for, 239
  oral, mandibular, technique for, 238
  oral, tuberosity, 239
Anesthetic, selection of, for oral surgical operations, 209
Anesthetics, local, comparative efficiency of, 259
  local, reporting accidents from, 282
  some common, toxic factors of, 260
Army and Navy Dental News, 272
Army Dental Corps, assignments, 274
Army, dentistry as a separate department of the, 222
  need of more prosthetic dentists in the, 224

Barrett, Thos. J., on the relation of the surgeon and the dentist in face and jaw diseases, 246
Bite, taking the, 227
Black, Harvey G., "Relation of Chronic Infection to Thyroid Deficiency," review of, 264
Blair, Vilray P., "Surgery and Diseases of the Mouth and Jaws," review of, 257
Blood symptoms may produce symptoms in the mouth, 236
Bone-grafts, experiments with the use of, 258
Books received, 258
Bridge, clasp, advantages of, 208
  disadvantages of, 208
  technique of making, 205
Bridge work, removable, with cast clasps, a simple form of making, 204
Bunting, R. W., "The Effect of Mouth Infections upon the General Health," 229
Burns, Robert, Jr., "Septic Teeth: Their Etiology and Surgical Treatment" (correspondence), 241

California State Dental Association, 285
Callahan, John R., notice of death of, 271
Camp Pike Dental Society, 275
Canker, 235
Caries, dental, relation of oral secretions to, 197
Carrea, Juan A., "A Case of Pyorrhea Alveolaris Treated by Intramuscular Injections of Emetin Hydrochlorid," review of, 259
Casting Watt's metal plates with porcelain teeth, to get the best results in, 265
Casto, T. D., on impression taking, 250
Chiavaro, Angelo, "A Rare Case of Replantation of the Teeth," review of, 261
Clasps, cast, for removable bridge work, 204
Connecticut State Dental Association, 284
Coriat, Isador H., "The Presence of Taste Fibers in the Lingual Nerve," 217
Cotton rolls, to hold in place while operating, 265
Crown and bridge soldering, an aid in, 265
Cysts, dentigerous or follicular, 215
  periodontal or radicular, 214

David, John W., obituary notice of, 270
Dental Library Association, 283
Dental Society of the State of New York, 284
Dental society meetings, coming, list of, 282
Dentist, increased responsibilities of the, in the present world-war, 220
Diabetes, early symptoms of, in the mouth, 236
Diagnosis, X-ray, should it supplement or supersede the clinical? 265

Discussion on "A Simple Form of Removable Bridge Work with Cast Clasps," 246
on "Method of Taking Modeling Compound Impressions with the Mouth Closed and Under Normal Biting Strain," 250
on "Selection of Anesthesia for Oral Surgical Operations, and the Roentgen Ray as an Aid in Diagnosis," 244
on "The Influence of General Health on Oral Tissue," 242
on "The Relation of the Surgeon and Dentist in Face and Jaw Injuries," 246
Dolamore, W. H., "Further Experiments with the Use of Bone-grafts," review of, 258
Drexler, John H., "Method of Taking Modeling Compound Impressions with the Mouth Closed and Under Normal Biting Strain," 225
Duchange, R., "Oculo-cardiac Reflex in Cases of Contractures of the Jaws," review of, 266
Ductless glands, relation of, to mouth conditions, 237

EMETIN hydrochlorid, treatment of pyorrhea by intramuscular injections of, 259
Endamœba buccalis, its reactions and food-taking, 262
Extraction, to avoid after-pain in, 266
Extractions, impactions, and exostosis, difficult, 211

FORSYTH Training School for Dental Hygienists, 285
Fox, F. A., on impression taking, 252
Fracture of inferior maxilla, technique of wiring corresponding teeth in superior and inferior maxilla, 261
Free dentistry in New Zealand, 265

GRAHAM, EVARTS A., "Toxic Factors of Some Common Anesthetics," review of, 269
Granuloma cases, surgical technique of, 266
Grove, Carl J., "Treatment of Root-canals with Putrescent Pulps," review of, 263

HALL method of making impressions, 268

ILLINOIS State Dental Society, 284
Impressions, modeling compound, method of taking with the mouth closed and under normal biting strain, 225
the Hall method of making, 268
Indiana Board of Examiners, 286
Infantile scurvy, 235
Infection, chronic, relation of, to thyroid deficiency, 264
Infections, mouth, effect of, upon the general health, 229
Iowa State Dental Society, 284

KANSAS State Dental Association, 283
KCNS in tobacco, 267
Kentucky State Dental Association, 284

LEGISLATION proposed for naval dental corps,
Lewis, D. N., "The Porcelain Jacket Crown," review of, 260
Literature, Dental Scientific (editorial), 254
Luckie, S. B., on impression taking, 251

MANSON, DAVID, on the influence of general health on oral tissue, 242
Matteossian, H. B., on plaster *vs.* modeling composition for taking impressions, 251
Medical corps instruction extended, 275
Meisburger, Louis, "Practical Sterilization for the Dentist," 240
Michigan State Dental Society, 283
Miner, L. M. S., "The Influence of General Health on Oral Tissue," 234
on the use of local in connection with general anesthesia, 244
Missouri State Dental Association, 283
Mississippi Board of Examiners, 286
Modeling compound, preparation of, for taking impressions, 226
technique of taking impressions with, 226
Morrison, James Beall, obituary notice of, 269
Mouth, systemic disturbances reflected in, 234
Muscle-trimming, 227

NAVY DENTAL CORPS, proposed legislation for, 272
Nesbett, Norman B., "A Simple Form of Removable Bridge Work with Cast Clasps," 204
New Jersey Board of Registration, 285
New Jersey State Dental Society, 285
New Zealand, free dentistry in, 265
Nomenclature, orthodontic, 267
North Carolina Dental Society, 285
Northeastern Dental Association, proceedings of, 242
election of officers, 245
Northwestern University Dental School, 284
Novocain to be made in America as procain, 264
Nowlin, Nadine, "Endamœba Buccalis: Its Reactions and Food-taking," review of, 262

ODONTOLOGICAL Society of Western Pennsylvania, 283
Officers, dental, promotion of, 274
Ontario Dental Society, 284
Oral infections, effect of, on the general health, 229
Oral surgeon and other specialists, need of co-operation between, 221
Oral tissue, influence of general health on, 234
Orthodontic nomenclature, 267

PAIN, to relieve, 264
Patents, dental, monthly record of, 286
Pennsylvania State Dental Society, 284
Physical examination of registrants in the army, 274
Pond, W. R., on the influence of general health on oral tissue, 242
Porcelain jacket crown, 260
Preparedness League of American Dentists, 277
Preventive dentistry the dentist's safeguard, 230
Prinz, Hermann, "The Relationship of Oral Secretions to Dental Caries: (ii) Conditions Influencing the Quantity and Action of the Amylase Content of Human Saliva," 197
Prosthetic dentistry, necessity of more interest in, 223
Pyorrhea, conditions similar to result of gastro-intestinal disorders, 236
treatment of, by intramuscular injections of emetin hydrochlorid, 259

RADIOGRAPHS, dental, technique of making, 232
Replantation of the teeth, a rare case of, 261
Robinson, W. J., on modeling compound for taking impressions, 251
Roentgen ray as an aid in diagnosis, 209
Root-canal filling, efforts to standardize the operation of, 231
Root-canals, method of filling, 266
with putrescent pulps, treatment of, 263
Root-resection in granuloma cases, surgical technique of, 266

SALIVA, human, conditions influencing the quantity and action of the amylase content of, 197
Scientific Literature, Dental (editorial), 254
Septic teeth, etiology and surgical treatment of, 241
Sinusitis, maxillary, caused by conditions of the teeth, 213
Soldering, crown and bridge, an aid in, 265
Sollman, Harold, "Comparative Efficiency of Local Anesthetics," review of, 259
South Carolina Board of Examiners, 286
South Carolina Dental Association, 284
Sterilization, practical, for the dentist, 240
Stilson, I. B., on removable bridge work with cast clasps, 246
Surgeon and dentist, relation of, in face and jaw injuries, 220
"Surgery and Diseases of the Mouth and Jaws," by V. P. Blair, review of, 257

TASTE fibers, presence of, in the lingual nerve, 217
Tempering small tools, 265
Texas State Dental Society, 283
Thoma, Kurt H., "Selection of Anesthesia for Oral Surgical Operations, and the Roentgen Ray as an Aid in Diagnosis," 209
Tobacco, KCNS in, 267

VAUGHAN, HAROLD S., "Oral Anesthesia," 238
Vermont State Dental Society, 283
Veronal, to be made in America as barbital, 264
Virginia State Dental Association, 284

WATT'S metal plates, to get the best results in casting, with porcelain teeth, 265
Waugh, Leuman M., "The Technique of Making Dental Radiographs," 232
Western Fairfield County (Conn.) Dental Society, 285
Weston, Wm. H., on iodin for gum sterilization before using novocain, 245
Wheeler, Herbert L., "The Relation of the Surgeon and the Dentist in Face and Jaw Injuries," 220
Wiring corresponding teeth of superior and inferior maxillæ in fracture of inferior maxilla, 261

X-RAY diagnosis, should it supplement or supersede the clinical? 265
X-ray pictures, dental, technique of making, 232
X-ray, the, as an aid in diagnosis, 209, 231

Subject Index for April 1918.

Academy of Stomatology of Philadelphia, proceedings of, 334
"l'Aide Confraternelle," American contributions to, 348
Amalgam, technique for packing, 359
American Ambulance Hospital of Paris, at Neuilly—operative dental section (illustration), 330
American Illustrated Medical Dictionary, by W. A. N. Dorland (bibliographical), 349
American Society of Orthodontists, 375
Anesthesia and respiration, 355
Anesthesia, local, for painless operating, 356
local, indications and contra-indications for, 358
Anesthetic, the new local: Apothesine, 298
Angina, Vincent's, 355
Vincent's, from the oral surgical standpoint, 296
Annealing lingual bars, 356
Anthony, L. P., "Brief Review of Current Dental Literature," 301
Antiseptic, iodin as an, 356
Apothesine, chemical composition of, 298
technique of injection, 298
Army and navy dental news, 367
Atmospheric pressure in retention of dentures, 357

Baltimore College of Dental Surgery, 375
Bars, lingual, annealing, 356
Batcheff, C. W., "A Case of Tooth Gemination" (correspondence), 330
Bibliographical: A brief review of current dental literature, by L. P. Anthony, 301
Bleaching teeth, 356
Bliven, C. Frank, on engineering principles applied to dentistry, 341
Blood stains, removing, 356
Bridge work, faulty co-ordinating, traumatism due to, 321
proper occlusion a necessity in, 322
perfect, requisites of, 325
use of the anatomical articulator in, 323
Bronchoscopic cases, three, the result of dental procedure, 359

California State Dental Association, 378
Callahan, John R., obituary of, 360
Caries, relation of oral secretions to, 287
Cast, making a workable, 357
Cement, a hint on mixing, 356
Cement filling, silicate, reinforced, 358
Clean mouths, economic value of, to the community, 295
Connecticut Dental Hygienists' Association, 376
Connecticut State Dental Association, 376
Cyst, follicular dental, report of a case of, 319

Dakin, H. D., and E. K. Dunham, "Solvents for Dichloramine-T," review of, 351
Decayed teeth, effects of, upon a child's progress in school, 293
Delabarre, F. A., on engineering principles applied to dentistry, 338
Denney, R. E., "Report of a Case of Follicular Dental Cyst," 319
Dental Library Association, special notice, 373
Dental Society of the State of New York, 377
Dental society meetings, coming, 374
Dentistry and the war: American Ambulance Hospital of Paris, at Neuilly, operative dental section of (illustration), 330
Dentures, retention of, atmospheric pressure in the, 357

Deupès, "Two Cases of Fistula from the Parotid Gland, Cured by Resection of the Auriculo-Temporal Nerve," review of, 352
Dichloramine-T, remarks on, 354
solvents for, 351
Dieulafé, L., "Salivary Fistulæ," review of, 352
Discussion on "Care of the Mouth During Pregnancy," 334
on "Engineering Principles Applied to Dentistry," 338
on "Report of a Case of Follicular Dental Cyst," 335
on "The Bearing of Physical Anthropology on the Problems of Orthodontia," 332
Dorland, W. A. N., "American Illustrated Medical Dictionary" (bibliographical), 349
Dunham, E. K., and H. D. Dakin, "Solvents for Dichloramine-T," review of, 351
Dunham, Edward K., "Remarks on Dichloramine-T," review of, 354

Eastern Association of Graduates of the Angle School of Orthodontia, announcement, 377
proceedings of, 331
Engineering principles applied to dentistry, 336

Filling, reinforced silicate cement, 358
Fistula from the parotid gland, two cases of, cured by resection of the auriculo-temporal nerve," 352
salivary, 352
Florida State Dental Society, 377
Fractures, jaw, involving extensive loss of structure, cicatricial bands in the treatment of, 316

Gemination, tooth, a case of, 330
Georgia State Dental Society, 377
Gernez and Lemière (MM.), "The Conservation and Utilization of Cicatricial Bands in the Treatment of Jaw Fractures Involving Extensive Loss of Substance," 316
Gold inlay method, indirect-direct, 328
Graves, M. L., "Oral Sepsis and the Anemias," review of, 352
Gregory, W. K., on the general correlation of proportions in the skull, 333

Haas, A. R. C., "Anesthesia and Respiration," review of, 355
Haines, H. A., "Vincent's Angina from the Oral Surgical Standpoint," 296
Hellman, Milo, on the bearing of physical anthropology on the problems of orthodontia, 332
Hypertrophied tissue, an interesting case of, 356

Illinois State Dental Society, 377
Indiana Board of Examiners, 379
Infection, chronic focal, incidence of, in chronic diseases, 354
Iodin as an antiseptic, 356
Ionization, casting zinc electrode points for, 360
in the treatment of neuralgia, 357
Iowa State Dental Society, 376

Jaw fractures involving extensive loss of substance, cicatricial bands in the treatment of, 316
Johnson, Earle E., "Effects of Decayed Teeth upon a Child's Progress in School," 293

Kansas State Dental Association, 376
Kentucky State Dental Association, 377
Kotts, Fred A., "Casting Zinc Electrode Points for Ionization," 360
Küsel, Geo. C., on care of the mouth during pregnancy, 334

Laboratory, dental, limitations of the, 325
"l'Aide Confraternelle" Honor Roll, 348

Langstroth, Lovell, "The Incidence of Chronic Focal Infection in Chronic Diseases," review of, 354
Legislation, Pending Navy Dental (editorial), 344
proposed, for the navy dental corps—bill in Congress, 365
Lemière and Gernez, "The Conservation and Utilization of Cicatricial Bands in the Treatment of Jaw Fractures Involving Extensive Loss of Substance," 316
Literature, current dental, a brief review of, 301
Local anesthesia for painless operating, 356
Leucoplakia oris, 358

MAINE Board of Examiners, 380
Maine Dental Society, 379
Massachusetts State Dental Society, 376
Maltase, tests for, 289
Mandibular movement—teeth do not control, 357
Maryland Board of Examiners, 379
Matteossian, H. B., on care of the mouth during pregnancy, 335
Mershon, J. V., on the removal of infected roots of deciduous teeth, 335
Mewborn, Joseph L., obituary of, 361
Michigan Board of Examiners, 379
Michigan State Dental Society, 375
Mississippi Board of Examiners, 380
Mississippi State Dental Association, 375
Missouri State Dental Association, 376
Moffitt, R. H., obituary of, 364

NATIONAL Association of Dental Faculties, 375
Navy Dental Legislation, Pending (editorial), 344
Navy dental corps, proposed legislation for—bill in Congress, 365
Neuralgia, ionization in the treatment of, 357
New Jersey Board of Registration, 379
New Jersey State Dental Society, 379
Northeastern Dental Association, proceedings of, 336
Northern Ohio Dental Association, 377
North Carolina Board of Examiners, 380
North Carolina Dental Society, 377
Northwestern University Dental School, 377

ODONTOLOGICAL Society of Western Pennsylvania, 376
Ontario Dental Society, 376
Orthodontia, bearing of physical anthropology on the problems of, 305
Osborn, H. F., on the bearing of physical anthropology on the problems of orthodontia, 333
Osler on defective teeth, 296

PACKING amalgam, technique for, 359
Patents, dental, monthly record of, 380
Pennsylvania Board of Examiners, 379
Pennsylvania State Dental Society, 375
Postgraduate Dental Meeting [Alabama, Mississippi, Texas, and Louisiana], 378
Pregnancy, importance of dental supervision during, 314
Preparedness League of American Dentists, news and notes, 371
Prinz, Hermann, "The Relationship of Oral Secretions to Dental Caries: III. Ferments of Human Saliva Other Than Amylase," 287
Public health, unclean mouths a menace to, 294

RURAL dental clinic, equipment for, 293

SALIVA, human, ferments of, other than amylase, 287
human, supposed sugar content of, 291
Salvas, J. Clarence, "Importance of Dental Supervision During Pregnancy," 314

School children, importance of caring for the teeth of, 294
Sepsis, oral, and the anemias, 352
Shields, J. S., "Apothesine, the New Local Anesthetic: The Revised Technique of Pterygo-mandibular Injection," 298
Silicate cement filling, reinforced, 358
Skull, correlation of measurements of the, different parts of, 309
relation of the different parts of the, 307
Smith, Fred M., "in memoriam" resolutions, 364
South Carolina Board of Examiners, 380
South Carolina State Dental Association, 377
Stains, blood, to remove, 356
Stanton, F. L., "Engineering Principles Applied to Dentistry," 336
Stillman, Paul R., "Traumatism Due to Faulty Co-ordinating Bridge Work," 321
Stilson, Ira B., on engineering principles applied to dentistry, 340
Sullivan, L. R., "The Bearing of Physical Anthropology on the Problems of Orthodontia," 305

Tennessee State Dental Association, 377
Texas State Dental Society, 375
Toothbrush, use of the, 357
Trauma, dental periclasia the result of, 323
Type, development of the individual not controlled by the biologic factor which determines, 311
Types, development of, influence of environment on the, 306
development of, race the controlling factor in, 307

Vincent's angina, 355
from the oral surgical standpoint, 296
Virginia State Dental Association, 376

Waas, M. J., "Indirect-Direct Gold Inlay Method," 328

Subject Index for May 1918.

Abbe, Robert, "Paget's Disease of the Bone," review of, 451
Abnormal mouths, restoration of, before inserting plates, 414
Alveolar processes of the jaws, healthy and diseased conditions of the, 426
Amalgam fillings, 453
American Medical Association—Section on Stomatology, 468
American Society of Orthodontists, 467
Amputation, root, technique of, 381
Apothesine, 452
Army and Navy Dental News, 459
Articulation, anatomical occlusion and, in artificial dentures, 455

Babonneix, L., and Lorgnier, "A New Case of Heredo-syphilis Nerviosa," review of, 447
Baltimore College of Dental Surgery—Class of 1913, 467
Bands, matrix, method of keeping, 452
Bismuth poisoning as affecting the oral cavity, 451
Bite, determining the length of the, 453
  method of taking, 406
Blight, Fred J., "Bismuth Poisoning as Affecting the Oral Cavity," review of, 451
Bone, atrophy or physiological absorption of, 428
  Paget's disease of the, 451
Bryan, L. C., obituary of, 462

California Board of Examiners, 471
California State Dental Association, 470
Carabelli, significance of the tubercle of, 447
Castings, to obtain smooth, 452
Cementum, the, 427
Chlorcosane apparently the ideal solvent for dichloramine-T, 453
Chloro-percha, radiolucency of, in the radiograph, 433
Cohen, M. B., "An Experimental Study of Root-filled Teeth: Preliminary Report," review of, 450
Connecticut Dental Commission, 470
Crockett, Frank S., "Kidney Infection as a Result of Pyorrhea," review of, 449
Crown, cementing the, 407
Crowns, jacket, restorations with, 402
Cyst, radicular, operation for, 390

Davis, Isaac H., obituary of, 461
Davis, W. Clyde, "Radiolucency of Chloro-percha in the Radiograph," 433
Delta Sigma Delta Fraternity, 467
Demarquette, J. C., "Senility of the Dental Tissues Among Soldiers," review of, 452
Dental profession, enlarged opportunities for, under present world conditions (see editorial), 444
Dental society meetings, coming, list of, 467
Dental Society of the State of New York, 469
Dentistry in the New Era (editorial), 441
Dentures, clasped, advantages of, 455
  full upper, on a gold base, 453

Discussion on "Healthy and Diseased Conditions of the Alveolar Processes of the Jaws," 437
on "The Evolution of Orthodonty," 435
Disease, pathological changes induced by, in the oral tissues, 431

EASTERN Association of Graduates of the Angle School, announcement, 467
proceedings of, 435

FERRIS, H. C., on healthy and diseased conditions of the alveolar processes of the jaws, 438
Filling root-canals, technique for, 455
Fillings, amalgam, 453
Florida State Dental Society, 469
Function, influence of, upon form development, 399

GALIPPE, V., "An Alleged Dental Stigma of Congenital Syphilis," review of, 447
Georgia State Dental Society, 469
Gerstenberger, H. J., "The Pathogenesis of Infantile Scurvy: An Hypothesis," review of, 449
Gingival tissue, the, 427
Godlee, Sir Rickman P., "Lord Lister" (bibliographical), 445
Gregory, Wm. K., "The Evolution of Orthodonty, 417
on healthy and diseased conditions of the alveolar processes of the jaws, 437
Grinding and crushing teeth, evolution of, 421

HEALING art, dentistry's importance as a department of the (see editorial), 442
Hellman, Milo, on the evolution of orthodonty, 435
Hopewell-Smith, A., "On Healthy and Diseased Conditions of the Alveolar Processes of the Jaws," 426
Hovestad, J. F., "Restorations with Jacket Crowns," 402

ILLINOIS Dental Society, 468
Indiana Board of Examiners, 472
Infantile scurvy, pathogenesis of, 449
Iowa Board of Examiners, 471
Iowa State Dental Society, 468

JACKET crown, all-porcelain: making the metal die, 408
making the matrix for, 408
packing-in the porcelain, 410
shaping and carving the porcelain, 410
Jacket crowns, restorations with, 402
Jaws of man and the lower animals, evidences of similar conditions in the, 429
Jeanselme, E., "The Significance of the Tubercle of Carabelli," review of, 447
Johnson, A. LeRoy, "The Nature of the Orthodontic Problem," 394

KENTUCKY Dental Association, 470

"LORD LISTER," by Sir Rickman P. Godlee (bibliographical), 445

McKINSTRY, W. H., "A Serological Investigation of Vincent's Angina," review of, 449
Maine Board of Examiners, 472
Maine Dental Society, 469
Mantoux, C., "The Fifth Cusp and Congenital Syphilis," review of, 447
Maryland Board of Examiners, 471
Massachusetts Board of Examiners, 470
Massachusetts Dental Society, 468

Matrix bands, good method for keeping, 452
Michigan Board of Examiners, 472
Mississippi Board of Examiners, 471
Mothers, dental treatment for, 453
Mozer, M., and C. Chenet, "The Dental Stigmata in Congenital Syphilis," review of, 447

National Association of Dental Faculties, 467
Naval dental surgeon, the, at work, 434
New Jersey Board of Registration, 472
New Jersey State Dental Society, 470
North Carolina Board of Examiners, 472
North Carolina Dental Society, 468
North Dakota State Dental Association, 467
Northern Ohio Dental Association, 468
Northeastern Massachusetts Dental Society, 469
Northwestern University Dental School, 468

Occlusion, anatomical, and articulation, in artificial dentures, 455
Omaha, Dental Dispensary of, 454
Orthodontia a biological problem, 396
Orthodontic problem, nature of the, 394
Orthodonty, evolution of, 417
Osborn, H. F., on the evolution of orthodonty, 435

Patents, dental, monthly record of, 472
Pennsylvania Board of Examiners, 471
Periosteum, the alveolo-dental, 427
Plate, restoration of abnormal mouths before insertion of, 414
Plates, clasped, advantages of, 455
full upper, on a gold base, 453
Porcelain jacket crown, fitting of, 407
Postgraduate dental meeting: Alabama, Mississippi, Texas, Louisiana, 469
Potter, N. B., A. McNeil, and S. Bradbury, "Streptococcus Oral Sepsis: Complement-Fixation Test, and the Value of Routine Blood Examinations," review of, 450
Preparedness League of American Dentists, 464
Prinz, Hermann, "The Technique of Root Amputation," 381
Pulpless tooth, preparation of, for jacket crown, 405
Pyorrhea, kidney infection as a result of, 449

Radiograph, radiolucency of chloro-percha in the, 433
what to expect and what not to expect from the, 454
Railliet, G., "The Mammillary Eminence of Sabouraud: Its Clinical Significance," review of, 447
Rhode Island Board of Registration, 472
Roberts, Percy W., "Syphilitic Joint Lesions Simulating Tuberculosis," review of, 447
Root amputation, anesthetization of parts involved, 386
incision for, 387
indications for, 381
instrumentarium, 383
operative procedures, 386
post-operative treatment, 388
Root-canals, technique for cleaning and filling, 455
Root-filled teeth, an experimental study of, 450
Ruyl, James P., "Restoration of Abnormal Mouths by Surgical Treatment Before Inserting Plates," 414

SABOURAUD, the mammillary eminence of, 447
Shearing teeth, evolution of, 420
Soldiers, senility of the dental tissues among, 452
South Carolina Board of Examiners, 471
South Carolina Dental Association, 470
South Dakota Board of Examiners, 472
Streptococcus oral sepsis; complement-fixation test, and value of routine blood examinations, 450
Sullivan, L. R., on "taurodontism," 438
on healthy and diseased conditions of the alveolar processes of the jaws, 438
Syphilis, congenital, alleged dental stigma of, 447
congenital, dental stigmata in, 447
congenital, the fifth cusp and, 447
heredo-syphilis nerviosa, a new case of, 447
Syphilitic joint lesions simulating tuberculosis, 447
TAYLOR, F. E., and W. H. McKinstry, "A Serological Investigation of Vincent's Angina," review of, 449
Tennessee State Dental Association, 470
Texas Board of Examiners, 470

VINCENT'S angina, a serological investigation of, 449

WASHINGTON Board of Examiners, 471
Washington State Dental Society, 470
Willett, E. W., "The Naval Dental Surgeon At Work" (correspondence), 434
Wisconsin Board of Examiners, 471

X-RAY picture, what to expect and what not to expect from an, 454

ZINC dies with zinc counters, 452
Zirkle, Wm. Mortimer, obituary of, 452

Subject Index for June 1918.

Alabama Board of Examiners, 553
Alcohol sterilization, 529
American Institute of Dental Teachers, 551
American Medical Association, Section on Stomatology, 546
American Society of Orthodontists, 549
Angle's law for obtaining harmony of features through tooth movement, 486
Anomaly, a dental, 539
Antiseptics and disinfectants, root-canal surgery with and through, 538
Apicoectomy, 500
  replanting *vs.*, 473
Arch, desirability of a method to determine the shape of, 483
  the normal, and dental engineering, 483
Arch form determined by size and shape of teeth, 488
Army Dental Corps, assignments, 543
  on the standard as to numbers in grades of commissioned *personnel* of, 541
Army Medical Corps, on the standard as to numbers in grades of commissioned *personnel* of, 541
Army, type of denture for use in the, 516
Army and navy dental news, 541
Army dentistry compared with that in civil life, 504
Articulation, temporo-mandibular, in the human type, 505
Asepsis *vs.* antisepsis in root-canal procedures, 491

Bacteriological examination, collecting material for, 537
Bone, transplantation of, 533
Books received, 526
Bowman, "Infectious Ulcero-membranous Stomatitis and Gingivitis," review of, 534
Breath, bad, causes of, 532
Breda, Achille, "Primary Syphilis of the Gums," review of, 529
Bridge work, fixed, the basic principle of, 536
Brooks, M. M., and W. A. Price, "The Relative Efficiency of Medicaments for the Sterilization of Tooth Structures," review of, 531

California State Dental Association, 551
Campbell, J. L., "Tumors of the Gums," review of, 528
Canan, C. W., "Causes of Bad Breath," review of, 532
Cancer, deaths from, 535
Christiansen, J., "Alcohol Sterilization," review of, 529
Collapse under anesthesia due to an enlarged thymus gland, 515
Connecticut Dental Commission, 552
Cooper, Ashley, "Case of Chronic Nephritis: Uremia; Severe Hemorrhage from Gums," review of, 530
Coriat, Isador H., "Collapse under Anesthesia due to an Enlarged Thymus Gland," 513
Crown, preparing the stump of a bicuspid or molar for, 535
Cureting, filing and, 538

Dakin, Henry D., and Edw. K. Dunham, "A Handbook of Antiseptics" (bibliographical), 524
Delta Sigma Delta Fraternity, 549
Dental Reserve Corps, promotions in, 543
Dental Service; Industrial (editorial), 521
Dental Society of the State of New York, 549
Dental society meetings, list of, 546
Dentistry in the army and in civil life, 504
Denture for army use, a type of, 516

Denture, vulcanite, method of replacing a broken tooth in, 535
vulcanite, polishing material for, 534
Dentures, artificial, full, retention of, 530
artificial, reliefs in, 536
Devitalizing pastes, use of, 493
Dunham, Edw. K., and H. D. Dakin, "A Handbook of Antiseptics" (bibliographical), 524

EATON, A. R., notice of death of, 540
Engineering, dental, and the normal arch, 483
English "Ivory Cross" fund, the, 542
Epulides, pathological anatomy of, 528
Epulis, giant-cell, of the upper jaw, 528
Erausquin, R., "The Pathological Anatomy of Epulides," review of, 528

FILING and cureting, 538
Fillings, root-, removing, 536
Florida State Dental Society, 551
Forceps especially adapted for use in extraction preparatory to replantation, 476
Forsyth Dental Infirmary for Children, notice of examination for permanent staff appointments, 544

GALLIE, W. E., and D. E. Robertson, "Transplantation of Bone," review of, 533
Georgia State Dental Society, 549
Gingivitis, infectious ulcero-membranous stomatitis and, 534
Gland, enlarged thymus, collapse under anesthesia, due to, 515
Gonococcus infection of the mucous membrane, 534

HALL, RUPERT E., "Retention of Full Dentures," review of, 530
Health, the mouth in a state of, 535

IDAHO Board of Examiners, 553
Indiana Board of Examiners, 551
Industrial Dental Service (editorial), 521
Inter-Allied Dental Congress [Congrès Dentaire Interalliés], (bibliographical), 525
Inter-articular fibro-cartilage of the temporomandibular articulation, 512
Iowa Board of Examiners, 553

KELLS, C. EDMUND, "Replanting *vs.* Apicoectomy," 473
"'Technique of Root Amputation,'" (correspondence), 520
Kentucky State Dental Association, 550
Kirk, E. C., "A Dental Anomaly" (Hints), 539
Kolmer, John A., and Edw. Steinfield, "The Disinfection of Pneumococcus-carriers," review of, 533

MCLEAN, DAVID W., "Asepsis *vs.* Antisepsis in Root-canal Procedure," 491
Maine Board of Examiners, 554
Maine Dental Society, 550
Malocclusion, importance of diagnosis of causes before attempting treatment, 485
Massachusetts Board of Examiners, 552
Mayhew, J. M., "Gonococcus Infection of the Mucous Membrane of the Oral Cavity," review of, 534
Meniscus of the mandibular joint, effect of loss of teeth upon, 509
Michigan Board of Examiners, 552
Mississippi Board of Examiners, 551
Missouri Board of Examiners, 552
Montana Board of Examiners, 554
Mouth, gonococcus infection of the mucous membrane in, 534
preparation of, previous to dental operations, 535

NATIONAL Association of Dental Examiners, 548
National Association of Dental Faculties, 549
National Dental Association, 548
Nebraska Board of Examiners, 553
New Jersey Board of Registration, 553
New Jersey State Dental Society, 551

Nephritis, chronic: uremia; severe hemorrhage from gums, 530
North Carolina Board of Examiners, 552
North Carolina Dental Society, 549
North Dakota Board of Examiners, 554
Northeastern Massachusetts Dental Society, 549
Northern Ohio Dental Association, 549
Northwestern University Dental School, 550

Occlusion, importance of, to the health of the mouth, 535
Oklahoma Board of Examiners, 553
Operations, dental, preparation of the mouth for, 535

Paper points in cleaning root-canals, 534
Patents, dental, monthly record of, 554
Pennsylvania Board of Examiners, 552
Plate work: Type of denture for army use, 516
Plates, artificial, reliefs in, 536
  full, retention of, 530
Pneumococcus-carriers, disinfection of, 533
Polishing material for dentures, 534
Postgraduate Dental Meeting (Ala., Miss., Texas, La.), 550
Prentiss, H. J., "A Preliminary Report upon the Temporo-mandibular Articulation in the Human Type," 505
Preparedness League of American Dentists, news and notes, 544
Price, W. A., and M. M. Brooks, "The Relative Efficiency of Medicaments for the Sterilization of Tooth Structures," review of, 531
Psi Omega Fraternity, 549
Pulp chambers of tender or sore teeth, opening the, 534
Pulp devitalization, 492
Pyorrhea alveolaris, 536

Raymond, E. H., "A Type of Denture for Army Use," 516
Reder, Francis, "Giant-cell Epulis of the Upper Jaw," review of, 528
Reliefs in artificial dentures, 536
Replantation, tooth, 474
  post-operative treatment, 478
  prognosis of, 474
  some illustrative cases, 480
  splint for, 479
  technique of the operation, 475
Replantation and transplantation of teeth, with special reference to the patho-histology of the tissues of attachment, 527
Replanting *vs.* apicoectomy, 473
Retter, Arwed, obituary notice of, 540
Rhode Island Board of Registration, 552
Robertson, D. E., and W. E. Gallie, "Transplantation of Bone," review of, 533
Root amputation, technique of, 520
Root-canal filling materials, 494
  technique for filling, 495
Root-canal instrumentarium, 493
Root-canal surgery with and through antiseptics and disinfectants, 538
Root-canal technique, outline for, 537
Root-canal treatment a specialty, 535
Root-canal work, standardization of, 498
Root-canals, cleansing of, 499
  obtaining free access to, 498
  paper points in cleaning, 534
  putrescent, antiseptic precautions in treatment of, 498
  refilling, after they are cleared, 499
Root-fillings, removing, 536

Seymour, L. N., "More Anent Standardization" (correspondence), 519
Smith, K. F., "The Practice of Dentistry in the Army and in Civil Life: A Comparison," 504
Sore teeth, opening pulp chambers in, 534
South Carolina Board of Examiners, 551
South Carolina Dental Association, 550
South Dakota Board of Examiners, 554
Standardization, More Anent (correspondence), 519
Steinfield, Edw., and John A. Kolmer, "The Disinfection of Pneumococcus-carriers," review of, 533

Sterilization, alcohol, 529
of tooth structures, relative efficiency of medicaments for, 531
Stomatitis, ulcerative, associated with Vincent's organisms, 542
Stump of bicuspid or molar, preparing, for a crown, 535
Summa, Richard, "The Importance of the Inter-articular Fibro-cartilage of the Temporo-mandibular articulation," 512
Syphilis, primary, of the gums, 529
Systemic conditions and the teeth, 501

TEMPORO-MANDIBULAR articulation, anatomy of, 509
importance of the inter-articular fibro-cartilage of, 512
in the human type, 505
Tennessee Board of Examiners, 553
Tennessee State Dental Association, 550
Texas Board of Examiners, 553
Tooth replantation, 474
Tumors of the gums, 528

UTAH State Dental Society, 549

VERMONT Board of Examiners, 533
Vincent's organisms, ulcerative stomatitis associated with, 542
Vulcanite denture, tooth replacement in, 535

WAAS, MILTON J., "Standardization of Root-canal Work," 498
Washington State Board of Examiners, 559
Washington State Dental Society, 550
Wilkinson, F. C., "Some Observations on the Replantation and Transplantation of Teeth, with Special Reference to the Patho-histology of the Tissues of Attachment," review of, 527
Williams, Percy N., "Dental Engineering and the Normal Arch," 483
Wisconsin Board of Examiners, 553

X-RAY, the, as an aid in root-canal operations, 500

Subject Index for July 1918.

Abscesses, pericemental, upon vital teeth, 570

Academy of Stomatology of Philadelphia, proceedings of, 614

After-pain following operation, 634

"l'Aide Confraternelle" Honor Roll, 624

Aiguier, Jas. E., "Improved Method of Casting Splints and Use of Headgear in Treating Fractured Jaws," 602

Amalgam fillings, large, in doubtful teeth, 634

American Academy of Oral Prophylaxis and Periodontology, 657

American Society of Orthodontists, 657

"Anatomy and Histology of the Mouth and Teeth" (bibliographical), by I. N. Broomell, 625

Anesthesia, nitrous oxid-oxygen, changes in the blood produced by, 633

Anilin dye as a germicide, 636

Antiseptic surgery, principles of, 586

Army and Navy Dental News, 647

Baltimore College of Dental Surgery, commencement of, 643

Bismuth-iodoform-paraffin paste, 634

Black's glandular epithelial cells, 556

Blood poisoning, result of negligence in sterilizing instruments, 645

Bone-grafting in gunshot wounds of the mandible, 632

Bridges, mobile, 629

Bridge work, casting dummies for, 635

Broomell, I. N., "Anatomy and Histology of the Mouth and Teeth" (bibliographical), 625

Burchard, H. H., on the nature of pericemental abscesses on vital teeth, 571

Burns, paraffin treatment of, 637

California State Dental Association, 657

Canadian Dental Association, 657

Cancer of the lip, treatment of, by radium, 632

Carroll, Rufus W., obituary of, 639

Casting, centrifugal, 635

Casting dummies for bridge work, 635

Casto, T. D., "Changes Produced in the Blood by Nitrous Oxid-Oxygen Anesthesia," review of, 633

Chiavaro, Angelo, "Replantation of Teeth" (correspondence), 613

Chloro-percha, radiolucency of, in the radiograph, 611

Cleft, alveolar, and of hard and soft palate, surgical correction of, 581

Cole, Percival P., "Non-union of War Fractures of the Mandible," review of, 629

Cysts of the dental system, 555

Davis, Isaac H., "in memoriam" resolutions, 639

Delta Sigma Delta Fraternity, 657

"Dental and Oral Radiography," by J. D. McCoy (bibliographical), 626

Dental Histology and Embryology, Textbook of, by F. B. Noyes (bibliographical), 626

Dental society meetings, list of coming, 655

Denticles, removal of thirty, from one bicuspid socket, 636

Dentures, clasped partial, *versus* bridge work, 629

Dewey, Kaethe W., "Cysts of the Dental System," 555

Die and counter-die for swaging saddles, 634

Discussion on "Pathology, Etiology, and Treatment of Pyorrhea," 614

Disinfection, methods of, as carried out in dental offices, an investigation of, 631

Doubleday, A. W., on the pathology, etiology, and treatment of pyorrhea, 615
Duke, Wm. W., "Oral Sepsis in Its Relationship to Systemic Disease" (bibliographical), 627

Eaton, Alvin R., obituary of, 638

Federspiel, M. N., "Surgical Correction of a Double Hare-lip, Alveolar Cleft, and Cleft of Hard and Soft Palate," 581
Fevers, specific, oral sepsis a complication of, 599
Fillings, large amalgam, in doubtful teeth, 634
Fractured jaws, improved method of casting splints and use of headgear in treating, 602
Free dental clinics, law authorizing establishment of, in municipalities of New Jersey, 644

George Washington University Dental School, commencement of, 641
Germicide, anilin dye as a, 636
Gormsen, L., "Mobile Bridges," review of, 629
Goslee, Hart J., "Clasped Partial Dentures *versus* Bridge Work," review of, 629
Gunshot wounds of the mandible, bone-grafting in, 632

Hare-lip, double, surgical correction of, 581
Headgears, necessity of, in treatment of fractured jaws, 608
Hertwig's sheath, 559
Hollande, "Ionization Applied to the Treatment of Facial Cicatrices," review of, 632
Holmes, Adah R., "An Investigation of the Methods of Disinfection Carried Out in Dental Offices," review of, 631
Hunter, Wm., "The Rôle of Sepsis and of Antiseptics in Medicine," 585
Hypodermic needle, blocked, to clean, 634

Instruments, root-canal, unsterilized, 635
sterilization of, 636
"Iodo-glycerole," 612
Ionization applied to the treatment of facial cicatrices, 632

Janeway, Henry H., "The Treatment of Cancer of the Lip by Radium," review of, 632

Kansas City Dental College, commencement of, 642
Kells, C. Edmund, "Radiolucency of Chloropercha in the Radiograph" (correspondence), 611
Kirk, E. C., on the clinical phenomena attending pericemental abscesses upon vital teeth, 571

"l'Aide Confraternelle" Honor Roll, 624
Lee, Alfred P., on the pathology, etiology, and treatment of pyorrhea, 618
London, John H., "in memoriam" resolutions, 640
Lysol, 634

McCoy, James D., "Dental and Oral Radiography" (bibliographical), 626
Maine Board of Examiners, 658
Mandible, unilateral hypertrophy of, 638
war fractures of, 629
Mastication, insufficient, due to frail alveolar bone, 576
Matrix, a handy, 634
Matteossian, H. B., on the pathology, etiology, and treatment of pyorrhea, 617
Medicine, the rôle of sepsis and of antisepsis in, 585
Mercury stains, to remove, from gold crown, 634
Merritt, A. H., "The Pathology, Etiology, and Treatment of Pyorrhea," 574
Montana Board of Examiners, 658
Montana State Dental Society, 657
Mottled teeth, notes upon, 631

NATIONAL Association of Dental Examiners, 657
National Association of Dental Faculties, 657
National Dental Association, 656
Naval Dental Corps, proposed legislation on, 647
increase and reorganization of, 647
Needles, hypodermic, to clean, 634
New Jersey, new dental law in, authorizing the establishment of free dental clinics in municipalities, 644
New Jersey State Dental Society, 657
New York City, oral hygiene ordinance for, 644
North Dakota Board of Examiners, 658
Nitrous oxid-oxygen anesthesia, changes produced in the blood by, 633
Noyes, F. B., "A Textbook of Dental Histology and Embryology, Including Laboratory Directions" (bibliographical), 626

OCCLUSION, traumatic, 576, 578
Oral hygiene ordinance for New York City, 644
"Oral Sepsis," 591
Oral Sepsis (editorial), 621
"Oral Sepsis in Its Relationship to Systemic Disease," by Wm. W. Duke (bibliographical), 627

PALATE, cleft, surgical correction of, 581
Paraffin treatment of burns, 637
Pennsylvania College of Dental Surgery, notice as to action of the Board of Corporators, 654
Pericemental abscesses on vital teeth, the nature of, 571
Phenol-sulfonic acid, advantages of, 635
Pickerill, H. P., "Unilateral Hypertrophy of Mandible," review of, 638
Piergili, "Note upon Mottled Teeth," review of, 631
Plaster models, to make, 637
Plate, making a, prior to extraction, 635
Platt, Harry, Geo. G. Campion, and Barron Rodway, "On Bone-Grafting in Gunshot Wounds of the Mandible," review of, 632
Preparedness League of American Dentists, 651
Prinz, Hermann, "'Technique of Root Amputation'" (correspondence), 613
Psi Omega Fraternity, 657
Pyorrhea, etiological factors in, 575
exciting causes of, 577
predisposing causes of, 575
post-operative treatment of, 579
root surgery in the treatment of, 579

RADIOGRAPH, radiolucency of chloro-percha in the, 611
Radiography, Dental and Oral, by J. D. McCoy (bibliographical), 626
Radium, treatment of cancer of the lip by, 632
Replantation of teeth, 613
Root amputation, technique of, 613
Root-canal instruments, unsterilized, 635
Root-cysts, etiology of, 563
origin of epithelial cells in, 562
dental, some rare features of, 564
dental, vascular changes in, 567
Rouw, R. Wynne, "'Iodo-Glycerole'" (correspondence), 612
Roy, Maurice, "The Nature of Pericemental Abscesses upon Vital Teeth," 570

SALVAS, J. CLARENCE, on the pathology, etiology, and treatment of pyorrhea, 616
Scaling, method of desensitizing teeth that are sensitive to, 634
Sensitive teeth, to desensitize, before scaling, 634
Sepsis in medicine, *apparent* rôle of, 588
actual rôle of, 590
principles of treatment applicable to, 599
Sepsis, oral, in its relation to systemic disease (bibliographical), 627
oral, treatment of, 637

Sepsis, oral, clinical effects of, 595
specific fevers complicated by, 599
Sepsis, Oral (editorial), 621
South Dakota Board of Examiners, 658
Splint, cementing the, in treatment of fractured jaws, 608
technique for removal of, 608
technique of making, 604
Stains, mercury, to remove from gold crown, 634
Sterilization of instruments, 636
Sterilizing instruments, negligence in, charged in blood poisoning case, 645
Stillman, Paul R., on pyorrhea, 614
Swaging saddles, die and counter-die for, 634
Systemic diseases and pyorrhea, connection between, 576

Texas Dental College, commencement of, 643
Toothbrush, inefficient use of, localized malnutrition due to, 576
Tooth-brushing, proper method of, 580

University of Pittsburgh School of Dentistry, commencement of, 641

Vanderbilt University School of Dentistry, commencement of, 642

War fractures of the mandible, non-union of, 629

Subject Index for August 1918.

Abscess, apical, case of blindness caused by, 673
Abscesses, pericemental, upon vital teeth; their nature, 668
Academy of Stomatology of Philadelphia, proceedings of, 710
Air-bubbles in plaster casts, to avoid, 727
American Academy of Oral Prophylaxis and Periodontology, 756
American Society of Orthodontists, 756
Anesthesia, nerve-blocking, advantages of, 729
Antiseptics, toxicity of certain widely used, 722
Apothesine, 730
Arch form, 730
Armies, British and French, Vincent's angina in the, 750
Army Dental Corps, assignments, 751
Army, English, teeth of the, 749
American, dentistry and the health of, 749
Army cantonment, the dental clinic in the, 704
Atlanta-Southern Dental College, commencement of, 747
Austin, J. H., and H. D. Taylor, "Toxicity of Certain Widely Used Antiseptics," 722

Banzhaf, H. L., "Minimum Requirements for Class 'A' Dental Schools" (Dental Educational Council), 701
Bayley, Malcolm W., "The Dental Clinic in the National Army Cantonment," 704
Bismuth salicylate for root-filling, 728
Blindness, case of, result of infection from apical abscess; cured by apicoectomy, 673
Blood coagulation, factors concerned in, 688
thromboplastin in treatment of, 689
Books received, 716
Bouty, R. J. C., "Vincent's Angina Among the Troops in France," 750
Bridges and crowns, setting, 727
Broaches, to prevent their falling into the throat, 727

Calculus, salivary, and so-called serumal, 661
Canadian Dental Association, 756
Caries, dental, rarity of, among pyorrhetic patients, 664
causes of, of general systemic origin, 663
Carr, Cassius M., patent declared void, 734
Cement, silicate, precautions in the use of, 728
silicate, spatulation of, 727
Cevey, Marcel, "A Clinical and Bacteriological Study of the Reinfection of Root-canals, especially After Treatment with Tricresol-formalin and Peruvian Balsam-iodoform," review of, 720
Chloramin-T solutions and hypochlorite, behavior of, in contact with necrotic and normal tissues *in vivo*, 722
Chloro-percha, radiolucency of, 708
Cincinnati College of Dental Surgery, commencement of, 736
College of Dental and Oral Surgery of New York, commencement of, 741
College of Jersey City, Department of Dentistry, commencement of, 740
Continuous-gum set, a new, 719
Crown, porcelain jacket, preparation of the tooth at the gum margin for, 728
Crowns and bridges, setting, 727

Delta Sigma Delta Fraternity, 757
Denney, R. E., on prophylaxis propaganda among the laity, 713
Dental Reserve Corps, assignments and promotions, 751
Dental Schools, minimum requirements for class "A" (Dental Educational Council), 701

Dental students of well-recognized dental schools, enlistment of, in medical enlisted reserve corps, 748
Dentin, sensitive, 727
sterilization of, 727
Dentures, finishing, 727
DeWitt, N. A., "Radiolucency of Chloropercha" (correspondence), 708
Discussion on "A Comparison of Office Policies, with Special Reference to Pulp Exposure or Death," 710
on "Non-cohesive Gold," 710
Drea, Wm. F., "Hemorrhage and Its Treatment," 688

Educational requirements, minimum, for class "A" dental schools (Dental Educational Council), 701
Elander, Karl, "The Principles Governing the Construction of Permanent Fixatures in the Treatment of Pyorrhea Alveolaris: With a New Method of Construction," 671
Encapsulation of the root-end, 727
technique of, 729
Endelman, Julio, on urate deposition, 665

Faught, F. A., "Essentials of Laboratory Diagnosis" (bibliographical), 715
"Non-cohesive Gold," 685
Forsyth Training-School for Dental Hygienists, 757

Gardiner, F. D., on non-cohesive gold, 713
on "prevention," rather than cure, 713
Georgetown University, Dental Department, commencement of, 737
Gingivitis, interstitial, 670
not an initial lesion of pyorrhea, 661
Gold, non-cohesive, 685
Gum margin of the tooth, preparation of, for a porcelain jacket crown, 728

"Hard" and "soft" teeth, 728
Harvard-Tufts Training-School for Dental Hygienists, 757
Hemophilia, treatment of, 717
Hemorrhage, treatment of, 688
kephalin in treatment of, 689
Hypochlorite and chloramin-T solutions, behavior of, in contact with necrotic and normal tissues *in vivo*, 722

Impressions, plaster, a good separating medium for, 727
Indiana Dental College, commencement of, 740
Infection the habitual accompaniment of pyorrhea, 662
the teeth as a focus of, 729
Inglis, Otto E., "A Comparison of Office Policies with Special Reference to Pulp Exposure or Death," 692
Iowa Board of Examiners, 758

Kassab, A., on education of the public in prophylaxis, 714
Kephalin as a hemostatic, 689
Kirk, E. C., upon the observed symptoms of pericemental abscess on vital teeth, 668
Kritchevski, D. S., "Scurvy-like Pyorrhea at the Front" (correspondence), 709

Laboratory Diagnosis, Essentials of (bibliographical), 715
Laval University, School of Dental Surgery, commencement of, 744
Legal decisions: Cassius M. Carr patent void, 734
Dentists' Mutual Protective Alliance wins in Taggart case, 735
Legislation, dental; provision for the Naval Dental Corps, 733
Lincoln Dental College, commencement of, 740
Logan, Geo. F., on educating the public along prophylactic lines, 713
on non-cohesive gold, 713
Loose teeth, fixature for securing permanent stability of, in treatment of pyorrhea, 675

Loyola University, School of Dentistry, commencement of, 739
Luckie, S. B., on non-cohesive gold, 712
on prophylaxis, 712

McConnell, Guthrie, "General Pathology and Bacteriology for Dental Students" (bibliographical), 715
McGill University, Department of Dentistry, commencement of, 737
Medical Enlisted Reserve Corps, enlistment in, for students of dental schools, 748

National Association of Dental Examiners, 757
National Association of Dental Faculties, 757
National Dental Association, 754
Naval appropriation bill—provision for the Naval Dental Corps, 733
Naval Dental Corps, legislation limiting rank of members of, to lieutenant-commander, 750
recent legislation concerning (see editorial), 723
Naval Dental Reserve Corps, examinations for, 750
Nerve-blocking anesthesia, advantages of, 729
New York College of Dentistry, commencement of, 738
Nies, F. H., "A New Continuous-Gum Set," review of, 719
Non-cohesive gold, 685
Nones, Henry B., obituary notice of, 732
North Pacific College, commencement of, 737
Northwestern University, Dental School, commencement of, 745
Nurses, student, recruiting of, for the army, 748

O'Brian, Louis A., obituary notice of, 732
Ohio State University, College of Dentistry, commencement of, 736
Overbite, extensive, pericemental abscesses on vital teeth the result of; cases illustrating, 669

Parsons, F. G., "The Modern English Skull," review of, 717
Patent litigation, decisions in: Cassius M. Carr patent void, 734
Dentists' Mutual Protective Alliance wins in Taggart case, 735
Patents, dental, monthly record of, 758
Pathology, General, and Bacteriology for Dental Students (bibliographical), 715
Philadelphia Dental College (Temple University), commencement of, 746
Plaster casts, to avoid air-bubbles in, 727
Plaster impressions, a good separating medium for, 727
Plate, rubber, to refit without vulcanizing, 727
Plates, finishing, 727
Plate work—a new continuous-gum set, 719
Policies, dental office, compared, with special reference to pulp exposure or death, 692
Preparedness League of American Dentists, 752
Psi Omega Fraternity, 757
Ptosis, a case of, as the result of pulpitis, 709
Pulp devitalization, contra-indicated, in placing permanent pyorrhetic "fixatures," 672
Pulp exposure or death, comparison of office policies, with special reference to, 692
Pulpitis, a case of ptosis as the result of, 709
Pyorrhea alveolaris, infection the habitual complication of, 662
causes of, of local origin, 660
pathogenesis and prophylaxis of, 659
symptoms of, 660
traumatic causes of, 663
Pyorrhea "fixatures," permanent, 672
permanent, avoiding pulp devitalization in placing, 672
permanent, esthetic requirements of, 677
permanent, history of development of, 678
permanent, must fulfil the demands of mouth hygiene, 677
Pyorrhetic teeth, immobilization of, 666

REGISTER, H. C., on a comparison of office policies in pulp exposure or death, 711
on non-cohesive gold, 710
Root-canals, study of reinfection of, after treatment with tricresol-formalin and Peruvian balsam-iodoform, 720
Roentgenograms, interpretation of, 695
Root-end encapsulation, 727
technique of, 729
Root-filling, bismuth salicylate for, 728
Roy, Maurice, "The Pathogenesis and Prophylaxis of Pyorrhea Alveolaris," 659
Royal College of Dental Surgeons, commencement of, 739
Rubber plate, to refit, without vulcanizing, 727

ST. LOUIS University, Dental Department, commencement of, 744
Sajous, Louis T. de M., "The Treatment of Hemophilia," review of, 717
Scurvy-like pyorrhea at "the front," 709
Sensitive dentin, 727
Silicate cement, precautions in the use of, 728
spatulation of, 727
Skull, the modern English, 717
"Soft" and "hard" teeth, 728
Spacing between natural and artificial teeth, 726
Spatulation of silicate cement, 727
Status Præsens, The (editorial): recent legislation on the naval dental corps, 723
Stellwagen, Thomas Cook, obituary notice of, 731
Sterilization of dentin, 727

TAGGART case, Dentists' Mutual Protective Alliance wins in, 735
Taylor, H. D., and J. H. Austin, "Toxicity of Certain Widely Used Antiseptics," review of, 722
Teeth, natural and artificial, spacing between, 726
variation in size of, in the same jaw, 728
Thomas W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania, commencement of, 742
Thromboplastin, use of, in treatment of hemorrhage, 689
Toothbrush, care of the, 730
Tricresol-formalin and Peruvian balsam-iodoform, study of the reinfection of root-canals after treatment with, 720

VINCENT'S angina among the troops in France, 750

WADE, THOMAS B., "Interpretation of Roentgenograms," 695
Wadsworth, Henry P., "A Case of Ptosis as the Result of Pulpitis" (correspondence), 709
Washington University, Dental Department, commencement of, 741
Western Dental College, commencement of, 745
Western Reserve University, Dental School, commencement of, 746
Winter, Geo. B., Exodontia Club, 758

X-RAY pictures, interpretation of, 695

Subject Index for September 1918.

Allison, Clarence S., "The Bactericidal Action of Arsenical Compounds on Experimentally Produced Streptococcic Septicemia," review of, 830
Alveolar lesions which accompany pyorrhea, 759
Alveolar resorption, Hopewell-Smith on, 763
evolution of, 765
prophylaxis of, 767
"Army Dentistry," by F. A. Keyes, review of, 827
Arsenical compounds, bactericidal action of, on experimentally produced streptococcic septicemia, 830

Beach, J. W., on the Preparedness League of American Dentists, 809
Behan, R. J., "Loose Cartilage in the Temporo-maxillary Joint," review of, 835
Bell, Thomas, precocious senility of the alveolo-dental tissues, 762
Bite for crown or bridge work, taking a, 840
Black, Greene Vardiman, Memorial (The), editorial, 824
Blepharospasm secondary to pyorrhea alveolaris, 834
Bogue, E. A., on the diagnosis of malocclusion in its early stages, 816
Books received, 828
Bulkley, L. Duncan, "Cancer of the Oral Cavity," 774
Burgess, Jas. K., "Success in Oral Restoration: What are the Fundamental Principles upon Which It Must be Based?" 785

Calculus, salivary, 832
Cancer, nitrate of silver contra-indicated in the treatment of, 776
of jaws and cheeks, heat and radium in the treatment of, 831
of the mouth and face, 839
of the oral cavity, 774
Cancer and other diseases of the oral cavity, importance of accurate differential diagnosis between, 775
Carr, Wm., "History of the Dental Society of the State of New York," 793
Carter, W. W., "Salivary Calculus," review of, 832
Cements, silicious, to maintain dryness of gingival cavity without rubber dam, in using, 841
Chicago College of Dental Surgery, commencement of, 846
Chinosol in root-filling, 838
Chipman, E. D., "Focal Infection in the Etiology of Skin Disease," review of, 836
Chloro-percha, radiolucency of, in the radiograph, 808
Churchman, J. W., "Fibroma of the Tongue, with Consideration of Other Tumors of the Tongue and Certain Technical Points in Tongue Resections," review of, 837
Clasp, the, as an anchorage for partial dentures, 840
Clinic, school dental, at Tonawanda, 840
College of Physicians and Surgeons, commencement of, 845
Colorado College of Dental Surgery, commencement of, 846
Connecticut State Dental Association, proceedings of, 815
Conservation of time in teaching dental students, 772
Contact point, the interproximal, 839
Co-operation in Scientific Research (editorial), 820
Crown, porcelain, new method for making, 839
Crown and bridge work, successful, Jas. K. Burgess on, 785
Crown or bridge work, taking bite for, 840
Cysts, retention, of the mucosa of the lip, 831

Daland, Judson, "Ulcerative Endocarditis Secondary to Dental Sepsis, Treated by Autogenous Vaccine," review of, 832
Dalhousie University, dental department, commencement of, 844
Davis, W. Clyde, "Radiolucency of Chloropercha in the Radiograph" (correspondence), 808

Delabarre, Frank A., "The Diagnosis of Malocclusion in Its Early Stages," 789
"Dental Electro-therapeutics," by Ernest Sturridge, review of, 827
Dental law, appointment of a permanent committee on, by the Dental Society of the State of New York, 797
effect of, on dental education, 795
first, in New York State, 794
Dental Society of the State of New York, history of, 793
organization of, 794
proceedings of, 809
Dentistry after the war; a promising professional field for young men, 806
Dentures, partial, the clasp as an anchorage for, 840
Dewey, K. W., "The Lipoids in Tumors of the Dental System," review of, 831
Dietetics and oral hygiene, 840
Discussion on "The Diagnosis of Malocclusion in Its Early Stages," 816
Dryness of gingival cavities, maintaining, without rubber dam, especially useful with silicious cements, 841

Enamel, mottled, investigation of, with special reference to its association with artesian water, 831
Endocarditis, ulcerative, secondary to dental sepsis, treated by autogenous vaccine, 833
Eye, diseases of, from focal infection, 834
Extracting diseased teeth, the question of, 839

Fibroma of the tongue, with consideration of other tumors of the tongue, and certain points in tongue resection, 837
"First line trench" in dentistry, 777
Focal infection, diseases of the eye due to, 834
in the etiology of skin disease, 836
Forsyth Dental Infirmary for Children, 856
Fractured jaw, to hold, for impression and adjustment, 838
Fraser, Alexander, "Mixed Tumors of the Salivary Glands: A Study Based on the Experimental Production of Neoplasm in the Submaxillary Gland of the Dog," review of, 837
Frazier, Chas. H., "A Surgeon's Impression of Trigeminal Neuralgia, Based on Experiences with 302 Cases," review of, 829

Gemination, tooth, a case of, 807
Greene Vardiman Black Memorial, The (editorial), 824

Harvard Dental School, commencement of, 845
Hayden, C. E., "Orokinase and Ptyalin in the Saliva of the Horse," review of, 833
Heat and radium in treatment of cancer of jaws and cheeks, 831
Howe, P. R., and Mildred R. Keniston, "The Salivary Factor in Relation to Dental Caries," review of, 835
Hygiene, oral, and dietetics, 840

Impression of fractured jaw, accurate way of taking, 838
Infection, focal, diseases of the eye from, 834
focal, in the etiology of skin disease, 836
Inter-Allied Dental Congress, publication of Transactions of the (editorial), 826
Interproximal contact point, the, 839

Jordon, M. Evangeline, "The First Line Trench in Dentistry," 777

Keniston, Mildred R., and P. R. Howe, "The Salivary Factor in Relation to Dental Caries," review of, 835
Kent, Edwin N., "Dentistry After the War: A Promising Professional Field for Young Men," 806
Keyes, Frederick A., "Army Dentistry" (Forsyth Lectures for the Army Dental Reserve Corps), (bibliographical), 827
Krebs, Adolph, "Disease of the Eye from Focal Infection," review of, 834
Kritchevsky, B., and P. Séguin, "The Pathogenesis and Treatment of Pyorrhea Alveolaris," 781

Lipoids, the, in tumors of the dental system, 831

McKay, F. S., "Progress of the Year in the Investigation of Mottled Enamel, with Special Reference to Its Association with Artesian Water," review of, 831
Malocclusion, early diagnostic signs of, 790
etiology of, 789
Marquette University, School of Dentistry, commencement of, 849
Massachusetts Board of Examiners, 856
Medical College of Virginia, College of Dentistry, commencement of, 847
Medical schools, continuous sessions in (report of A. M. A. Council on Medical Education), 772

Mixed tumors of the salivary glands, 837
Molar, first permanent, importance of saving, 778
Mottled enamel, investigation of, with special reference to its association with artesian water, 831
Mucosa of the lip, retention cysts of, 831
Murlless, F. T., on the diagnosis of malocclusion in its early stages, 819

NATIONAL Mouth Hygiene Association, 856
Neuralgia, trigeminal, a surgeon's impression of, 829
New, G. B., "Use of Heat and Radium in Treatment of Cancer of the Jaws and Cheeks," review of, 831
New York State, status of dentistry in, prior to 1868, 793
Northeastern Dental Association, 856
Nurses, training of, A. D. Bevan on, 772

ORAL hygiene, dietetics and, 840
Oral mutilations, prosthesis for, 841
Oral restoration, success in; what are the fundamental principles upon which it must be based? 785
Osborne, Weeden Edward (dental surgeon U. S. navy), death of, 851
Osgood, Ammon, obituary of, 842
Ottofy, Louis, "A Case of Tooth Gemination" (correspondence), 807

PALATAL surface of vulcanite dentures, to obtain smooth finish on, 838
Patent Office, Washington—special notice, 855
Plates, vulcanite or metal, method of polishing, 838
Polishing vulcanite or metal plates, method of, 838
Porcelain crown, new method for making, 839
Preparedness League of American Dentists, Cleveland unit, election of officers, 856
Prosthesis for oral mutilations, 841
Pulpless teeth, the question of retention of, 838
Pyorrhea, blepharospasm secondary to, 834
clinical alveolar lesions associated with, 759
pathogenesis and prophylaxis of, 759
pathogenesis and treatment of, 781

RADIUM and heat, use of, in treatment of cancer of the jaws and cheeks, 831
Reinoehl, W. (see obituary notice of Leon VanderWhite), 842
Rich, Amos C., "President's Address" (Dental Society of the State of New York), 809
Root-filling, chinosol in, 838
Root surgery, 838
Roy, Maurice, "The Pathogenesis and Prophylaxis of Pyorrhea Alveolaris," 759
Rubber, conversion of, into vulcanite, 800
experiments in vulcanizing, 800

SALIVA of the horse, orokinase and ptyalin in, 833
Salivary calculus, 832
Salivary factor, the, in relation to dental caries, 835
School children, teeth of, best method of caring for, 779
School dental clinic at Tonawanda, 840
Scientific Research, Co-operation in (editorial), 820
Séguin, P., and B. Kritchevsky, "The Pathogenesis and Treatment of Pyorrhea Alveolaris," 781
Sepsis, dental, ulcerative endocarditis secondary to, treated by autogenous vaccine, 833
Silver nitrate contra-indicated in the treatment of cancer, 776
Silver nitrate stains, to remove, 838
Simpson, F., and R. L. Sutton, "Retention Cysts of the Mucosa of the Lip," review of, 831
Skin disease, focal infection in the etiology of, 836
Snow, Geo. B., "The Conversion of India Rubber into Vulcanite," 800
Susquehanna Dental Association of Pennsylvania, 856
Stains, silver nitrate, removing, 838
Stanton, F. L., on the diagnosis of malocclusion in its early stages, 818
Students, dental, conservation of time in teaching, 772
Sturridge, Ernest, "Dental Electro-Therapeutics" (bibliographical), 827
Sutton, R. L., and F. Simpson, "Retention Cysts of the Mucosa of the Lip," review of, 831

TALBOT, E. S., "Conservation of Time in Teaching Dental Students," 772
Temporo-maxillary joint, loose cartilage in the, 865
Thompson, H. M., "Blepharospasm Secondary to Pyorrhea Alveolaris," review of, 834

Tissues, alveolo-dental, precocious senility of, 762
Tongue, fibroma and other tumors of the, 837
Trigeminal neuralgia, a surgeon's impression of, 829
Tulane University, School of Dentistry, commencement of, 844
Tumors, mixed, of the salivary glands, 837
of the dental system, lipoids in, 831

University of Buffalo, College of Dentistry, commencement of, 849
University of California, College of Dentistry, commencement of, 844
University of Illinois, College of Dentistry, commencement of, 845
University of Maryland, Dental Department, commencement of, 848
University of Michigan, commencement of, 849
University of Minnesota, College of Dentistry, commencement of, 847
University of Southern California, College of Dentistry, commencement of, 847

VanderWhite, Leon, obituary of, 842
Vulcanite, conversion of rubber into, 800
expansion and contraction of, 804
spongy, 805
Vulcanite dentures, to obtain smooth finish on palatal surface of, 838

War, the, and the dental profession, 810
Whartonitis, acute suppurative, 832

Zinc chlorid, deliquesced, use of, to maintain dryness of gingival cavity without rubber dam in using silicious cements, 841

Subject Index for October 1918.

Amputation, root, 914
Anderson, H. B., "Relationship of Oral Sepsis to Systemic Disease, and Its Bearing on Treatment," review of, 942
Anesthesia, conduction, 894
  general, methods of, in facial surgery, 942
Anesthesia and antiseptics in plastic restoration of the face and mouth, 942
Anesthetics, local, sterilization of, 945
Anhaeusser, H., "Care of Children's Teeth," 911
Antiseptics, chlorin, 947
Army Dental Corps, Expansion of (editorial), 935
Army dental service, the New Zealand, 952
Articulator, use of, in plate work, 881

Band, gold, to measure the circumference of a tooth for, 945
  of a gold crown in the bronchus; report of a case, 905
Base-plate, construction of, 880
Bite, taking the, 881, 883
Body growth, relation of dentition to, 899
British prisoners of war, twelve months with, 950
Bronchus, band of a gold crown in the, 905

Casts, flowing the, in plate work, 880
  separating the, from the plaster impression, 880
Chalier, J., "Frequency of Vincent's Angina," review of, 941
Children's teeth, care of, 911
  extraction of, 913
  filling materials for, 913
  pulp exposure in, 912
  treatment of cavities in, 912
Chlorin antiseptics, 947
Clark, R. A., "Professional Capability and Dental Commissions" (correspondence), 918
Classification of Dental Schools (editorial), 937
Clemons, E. Jay, "True Pruritis Ani: Its Association with Pyorrhea Alveolaris," review of, 944
Crown, shoulder, aid for the technique of, 945
Curet, a new, 889
  the adjustable, 890
  the surgical, 888
Curetting, 888
Cysts, dentigerous, with report of case, 944

Dental Corps, vacancies in, 954
Dental commissions and professional capability, 918
Dental Schools, Classification of (editorial), 937
Dental Society of the State of New York, proceedings of, 920
Dentition, relation of, to body growth, 899
Dentures, upper and lower, careful technique the greatest factor in the construction of, 876
Discussion on "Correspondent's Report" (Dental Society of the State of New York), 924
  on "Exercises for the Development of the Muscles of the Face, with a View to Increasing Their Functional Activity," 932
  on "President's Address" (Eastern Angle Association), 929
  on "Report of Committee on Practice" (Dental Society of the State of New York), 921
  on "The Past and Present of Operative Dentistry," 920
  on "The Physiological Age: The Relation of Dentition to Body Growth," 931

Eastern Association of Graduates of the Angle School of Orthodontia, proceedings of, 928
Expansion of the Army Dental Corps (editorial), 935

Facial development, general, exercise for, 870
Fanz, J. I., "The Use of Sandpaper in the Preparation of Histologic Ground Sections of Hard Substances," review of, 943

Fennel, Eric A., "Streptothrix Interproximalis, *nova species:* An Obligate Microaerophile from the Human Mouth," review of, 940
Ferris, H. C., on exercises for development of muscles of the face, 933
Fibrin paper as a hemostatic agent, 944
Fillings, gold, 885
gold foil, 946
synthetic, technique of, 946
Foil fillings, gold, 946
Frank, Ira, "Dentigerous Cysts, with Report of Case," review of, 944

Gasserian ganglion, tumor of, 941
Gold band, to measure the circumference of a tooth for, 945
Gough, F. A., on report of Committee on Practice (Dental Society of the State of New York), 922
Grieve, G. W., on President's Address (Eastern Angle Association), 929
Gropper, Adolph, "Vulcolox Anteriors in the Construction of Richmond Crowns and Bridge Work" (Hints), 939

Harvey, Samuel C., "Fibrin Paper as a Hemostatic Agent," review of, 944
Haughey, W., and R. D. Sleight, "Macroglossia Lymphangioma, with Report of Case," review of, 944
Hawley, C. A., on exercises for the development of the muscles of the face, with a view to increasing their functional activity, 932
Hemostatic agent, fibrin paper as a, 944
Hutchinson, J., "Operative Treatment of Trigeminal Neuralgia," review of, 940

Illinois Dental Examiners, 961
Impression taking, advantages of plaster over other methods of, 879
technique of, 877
Impressions, modeling compound, 878
plaster, 879
Iodin, trichlorid of, chemical properties of, 908
precautions in using the 25 per cent. solution of, 909
preparing the solution, 908
solubility of, in chlorcosane, 910
uses of the 1 per cent. solution, 909
uses of the 1 : 1000 solution, 910
Ionization, a practical demonstration of, 891
the objection to, 890

Jackson, Chevalier, and Wm. H. Spencer, "Band of a Gold Crown in the Bronchus: Report of a Case," 905
Jaws, treatment of injuries of the, 895
Johnson, A. L., on exercises for development of muscles of the face, 933

Kells, C. Edmund, "Topics of the Day: Curetting, Ionization, Pulp Testing," 888
Kelsey, H. E., on President's Address (Eastern Angle Association), 929
on exercises for development of the muscles of the face, 933
Kessler, S. J., "Sulfuric Acid in Root-canals" (correspondence), 918

Law, W. J., "Twelve Months with British Prisoners of War," 950
Leucoplakia of the tongue, 941

Macroglossia lymphangioma, with report of case, 944
Malocclusion, importance of proper muscle function in the correction of, 858
Massachusetts Board of Examiners, 961
Maxfield, Geo. A., obituary notice of, 947
Mershon, J. V., on exercises for development of the muscles of the face, 934
Michigan Board of Examiners, 961
Missouri Dental Examiners, 961
Montana Board of Examiners, 961
Montgomery, Douglass W., "Leucoplakia of the Tongue," review of, 941
Mouth, examination of, preparatory to making a plate, 877
Mulcahy, L. L., on "Correspondent's Report" (Dental Society of the State of New York), 927
Murlless, Frederic T., "President's Address" (Eastern Angle Association), 928
Muscle groups, consideration of the various, 862
Muscles of the face, exercises for the development of, 857
of mastication, 863
of mastication, exercises for the, 865
of expression, 869
Muscular tissue, physiology of, 859

National Association of Industrial Dental Surgeons, 960

Neuralgia, trigeminal, operative treatment of, 940
New Zealand army dental service, 952
Northeastern Dental Association, 960
Northern Illinois Dental Society, 960

Oklahoma Board of Examiners, 961
Operative dentistry, past and present of, 884
Osborn, Lloyd A., obituary notice of, 948
Ottolengui, R., on operative dentistry, 920
on motor cars for camps, 958

Patents, dental, monthly record of, 962
Paterson, Alexander H., "Careful Technique the Greatest Factor in the Construction of Full Upper and Lower Dentures," 876
Percy, Nelson M., "Tumor of the Gasserian Ganglion," review of, 941
Physiological age; the relation of dentition to body growth, 899
Plate work, arrangement of the teeth in, 882
Platysma myoides, 870
Preparedness League of American Dentists, 956
Pruritis ani, true; its association with pyorrhea alveolaris, 944
Pulp testing, 891

Rabinowitz, Meyer A., "Aberrant Thyroid Tumor of the Tongue," review of, 943
Richmond crowns and bridge work, vulcolox anteriors in, 939
Rockey, A. E., "Anesthesia and Antiseptics in Plastic Restoration of the Face and Mouth," review of, 942
Rogers, A. P., "Exercises for the Development of the Muscles of the Face, with a View to Increasing Their Functional Activity," 857
Rogers, Leonard, "Autogenous Oral Streptococcal Vaccines in the Treatment of Seventeen Cases of Sprue," review of, 942
Root amputation, 914
Root-canal treatment, 893
Root-canals, silver nitrate in, 945

Sandpaper, the use of, in the preparation of histologic ground sections of hard substances, 943
Sepsis, oral, relationship of, to systemic disease, and its bearing on treatment, 942
Shoulder crown technique, an aid in, 945
Silver nitrate in root-canals, 945
Slackers wanting their teeth pulled, 954
Sleight, R. D., and W. Haughey, "Macroglossia Lymphangioma, with Report of Case," review of, 944
Smith, Arthur W., "Root Amputation" (Correspondent's Report, New York State Dental Society), 914
Smith, B. Holly, "The Past and Present of Operative Dentistry," 884
Specialization in dentistry, 895
Spencer, Wm. H., and Chevalier Jackson, "Band of a Gold Crown in the Bronchus: Report of a Case," 905
Spier, Leslie, "Physiological Age: The Relation of Dentition to Body Growth," 899
Squire, D. H., on "Report of Committee on Practice" (Dental Society of the State of New York), 923
Sprue, autogenous oral streptococci vaccines in the treatment of, 942
Sphagnum moss as a surgical dressing, 945
Stanley, R. B., on President's Address (Eastern Angle Association), 929
Steel instruments, broken-off, dissolving in 25 per cent. aqueous solution of trichlorid of iodin, 909
Stenographers and typists—men and women —wanted by U. S. Government, 959
Sterilization of local anesthetics, 945
Stieglitz, Julius, "Procain and Novocain Identical" (correspondence), 919
Stillman, Paul R., "Report of the Committee on Practice—Dental Society of the State of New York," 893
Streptothrix interproximalis (new species), an obligate micro-aerophile from the human mouth, 940
Sulfuric acid in root-canals, 918
Surgical dressing, sphagnum moss as a, 945
Susquehanna Dental Association of Pennsylvania, 960
Synthetic technique, 946

Timerman, L. A., on "Correspondent's Report" (Dental Society of the State of New York), 925
Tray, individual, for impression taking, 877
trimming the, 878
Tumor, aberrant thyroid, of the tongue, 943
of the Gasserian ganglion, 941

University of Iowa, College of Dentistry, commencement of, 949
U. S. Army Dental Corps, on the, 894

U. S. Government call for stenographers and typists, 959

VINCENT'S angina, frequency of, 941
Vocational education, federal, 953
Vulcolox anteriors in the construction of Richmond crowns and bridge work, 939

WAAS, MILTON J., "Trichlorid of Iodin in Dentistry," 908
Wade, R., "Methods of General Anesthesia in Facial Surgery," review of, 942
Walker, A. S., on "Correspondent's Report" (Dental Society of the State of New York), 924
War and Dentistry: Teaching Oral Hygiene to French Children (illustration), 955
War prisoners, British, twelve months with, 950
Waugh, L. M., on report of Committee on Practice (Dental Society of the State of New York), 921
Weinberger, B. W., on President's Address (Eastern Angle Association), 930

Subject Index for November 1918.

Albray, R. A., "President's Address" (New Jersey State Dental Society), 1019

Aller, Thos. G., "War Surgery," 1025

Alveolar process, operation for removing a portion of, 999

Amalgam, to reduce expansion and contraction of, 1061

Amalgam restorations, 978

Anesthesia, procain-suprarenin, after-effects of, 971

Apical infections, 983

Approximal interspaces, conservation of, 976

Army dental corps, examination of candidates for, 1064

promotions and assignments, 1065

Asepsis and antisepsis in modern dentistry, 1059

Ash, C. F., on the Preparedness League of American Dentists, 1024

Batson, B. A., "Exodontia," 1006

Blocking the ophthalmic branch of the fifth nerve, 1060

Broomell, I. N., "Dentist or Stomatologist?" 980

Burgess, Jas. Kendall, "Nature's Tolerance and Compensating Adjustments as They Relate to Oral Restoration," 986

Caduceus, the, and the emblem of the medical profession, 1061

California Board of Examiners, 1070

Chase, Wm. G., on dentist or stomatologist? 1028

Contact point, a proper, importance of, 1060

Contact points on inlays and crowns, soldering, 1059

Contours, perfect, importance of, 977

Dental Protective Association, 1068

Dental Society of the State of New York, proceedings of, 1010

Dentist or stomatologist? 980

Dichloramin-T, idiosyncrasy to, 1060

Discussion on "Dentist or Stomatologist?" 1027

on "Procain for Dental Operations," 1036

on "The Control of Focal Infections," 1010

Dislocation, recurrent, of lower jaw, 1060

Education, dental, tending toward stomatology, 984

"Exodontia," 1006

anesthesia in, 1007

Expansion and contraction of amalgam, to reduce, 1061

Face and jaws, war injuries of the; collective review, 1054

Faught, L. Ashley, "The Conservation of Approximal Interspaces, Together with the Adjustment of Occlusal Relationships," 976

Fifth nerve, blocking the ophthalmic branch of, 1060

Filling, importance of a proper contact point in, 1060
Focal infections, control of, 963
most frequent seats of, 1004
surgical conditions resulting from, 1003
Foster, S. W., "The Influence of the War on Dentistry and Dental Colleges," 1001

Gold foil restorations, 978
Guthrie, J. M., "The Relation of Nasal and Oral Sepsis to Systemic Disease and Surgical Conditions Resulting from Focal Infections," 1003

Hardy, Chas. S., on dentist or stomatologist? 1027
Hines, C. E., "The Treatment of Pyorrhea Alveolaris," 992

Impression materials, 1000
Infections, focal, control of, 963
Inglis, O. E., on dentist or stomatologist? 1029
Inlay, the porcelain, 1061
wax, technique, 1060
Ionization, 1060
Ireland, M. W., advancement of, to rank of surgeon-general, 1064
Ivy, R. H., "War Injuries of the Face and Jaws: Collective Review," review of, 1054

Jarvie Fellowship medal, presentation of, to Geo. H. Wilson (Dental Society of the State of New York), 1016
Jaw, lower, recurrent dislocation of, 1060
Jaws and teeth, malformations of, 1059
Jaws, measurement of the force of the, 1058

Lewis, J. M., on procain for dental operations, 1036
Locking devices for two-piece splint, description of, 974

McLean, D. W., on the control of focal infections, 1013
Mallett, Stephen P., "Procain for Dental Operations," 966
Mandible, anesthesia of, with procain-suprarenin, 969
Maxilla, anesthesia of, with procain-suprarenin, 969
Mayo, C. H., "The Control of Focal Infections," 963
Medicine and dentistry, line of demarcation between, 985
relation of, 982
Michigan Board of Examiners, 1069
Mississippi Dental Association, proceedings of, 1041
Montana Board of Examiners, 1069
Moufang, Alphonse N., "A Suggestion for Making Splints in Two Separate Parts and Their Union by Means of a Lock," 972
Mouthwashes, uselessness of, 982

Navy dental corps, examination of candidates for, 1064
New Jersey Board of Registration, 1069
New Jersey State Dental Society, proceedings of, 1019

Noma, a case of, following paratyphoid B, 1059

Occlusion in bridge work, exaggerated importance given to, 988
normal. 976
Ohio State Dental Society, 1068
Oklahoma Board of Examiners, 1070
Oral restoration, nature's tolerance and compensating adjustments as they relate to, 986
Oral sanitation, 990

Patents, dental, monthly record of, 1070
Pearson, W. H., "President's Address" (Virginia State Dental Association), 1033
Pennsylvania Board of Examiners, 1069
Platinum, iridium, palladium; Government regulations limiting the sale, possession, and use of these metals and compounds thereof, 1066
Porcelain inlay, the, 1061
Preparedness League of American Dentists, 1062
Procain, anesthetic properties of, 966
Procain-suprarenin tablets, 967
solution prepared from, 968
Provan, Walter F., "Application of Silver Nitrate Solution in Root-canal Work" (Hints), 1053
Pulp, resistance of, to operative measures, 987
Pyorrhea alveolaris, diagnosis of, 993
surgical treatment of, 993
treatment of, 992

Rhein, M. L., on the control of focal infections, 1010
Rhode Island Board of Registration, 1069
Riethmueller, R. H., on dentist or stomatologist? 1028
Rip Van Winkle, M.D. (editorial), 1049
Robin, Pierre, "Measurement of the Force of the Jaws," review of, 1058
Romanelli, Enzo, "A Case of Noma Following Paratyphoid B," review of, 1059

Schaefer, S. W., "Asepsis and Antisepsis in Modern Dentistry," review of, 1059
Silver nitrate solution in root-canal work, application of, 1053
Soldering contact points on inlays and crowns, 1059
Splint, two-piece, advantages of, 975
description of the locking devices for, 974
technique of making, 972
Supplee, Samuel G., "Classification of Tissue Conditions in the Mouth as Related to Efficient Dentures," 996
Systemic conditions and the teeth, 981
Systemic disease, relation of nasal and oral sepsis to, 1003

Talley, F. R., on procain for dental operations, 1038
Tissue conditions in the mouth, classification of, as related to efficient dentures, 996

Virginia State Dental Association, proceedings of, 1033

War, influence of the, on dentistry and dental colleges, 1001

War injuries of the face and jaws; collective review, 1054
War surgery, 1025
Washington Board of Examiners, 1069
Wax inlay technique, 1060
Wright, T. B., "President's Address" (Mississippi Dental Association), 1041
Wright, Wm. R., on treatment of pyorrhea, 994
Wyckoff, W. T., on dentist or stomatologist? 1027

ZENTLER, ARTHUR, on dentist or stomatologist? 1028

Subject Index for December 1918.

Abscess, periodontal, 1091
Abutment, inlay, 1164
Alveoloclasia, 1091
Amalgam fillings, matrices for, 1163
American Institute of Dental Teachers, 1172
Anaphylaxis in connection with asthma, hay fever, and various skin diseases, 1112
Angle's ribbon arch, to fit and apply, 1163
Arch, Angle's ribbon, how to fit and apply, 1163
Armies overseas, some experiences in the camps and fields of, 1119
Army dentistry, 1107
Articulator, use of the, 1111
Asthma, hay fever, and various skin diseases, anaphylaxis in connection with, 1112

Barker, Lewellys F., and Sydney R. Miller, "Perforating Ulcer of the Hard Palate Resembling Tertiary Syphilis, but Due to a Fuso-spirillary Invasion," review of, 1160
Blanquie, Raoul H., "Camp Fremont Dental Corps Notes," 1166
Books received, 1153
Bridge work, 1106
  plaster bite for, 1164
Bronchoscopic cases of "dentists'" origin, 1158
Bronchoscopy, lower—tooth impacted in a secondary bronchus of the left lung removed by, 1158

California Board of Examiners, 1172
Camp Fremont Dental Corps notes, 1166
Camps and fields of the armies overseas, some experiences in, 1119
Chlorin, history of, as an antiseptic and disinfectant, 1072
Clinics, dental, in Manila, 1115
Commissions, dental, and professional capability, 1129
Compound, instructions in re-sterilizing, 1162
Conduction anesthesia, 1124
  instrumentarium for, 1124
  method of making injection, 1125
  preparation of the solution, 1125
Connecticut State Dental Association, proceedings of, 1142
Conzett, J. V., on the filling of root-canals, 1135
Coppage, H. R., on primary factors in the etiology of periodontoclasia, 1137
Coriell, L. D., "A Dental Trocar" (Hints), 1154
Crane, Arthur B., "When Shall Root-canals be Filled, and How?" 1093

Daniels, Benj., "'Professional Capability and Dental Commissions'" (correspondence), 1129
Delaware Board of Examiners, 1173
Dental Protective Association, 1172
Dentistry in Relation to Reconstruction (editorial), 1149
Dentistry, the next quarter century in, 1102
Devitalized pulp, to relieve pain of, 1162
Dichloramin-T, general action of antiseptics with special reference to, 1076

Dichloramin-T, pharmacology of, 1073
preparation of the solution, 1075
solvents for, 1074
Discussion on "Anaphylaxis in Connection with Asthma, Hay Fever, and Various Skin Diseases," 1143, 1145
on "Nature's Tolerance and Compensating Adjustments as They Relate to Oral Restoration," 1139
on "Primary Factors in the Etiology of Periodontoclasia," 1136
on "Some Experiences in the Camps and Fields of the Armies Overseas," 1130
on "The Conservation of the Approximal Interspaces, Together with the Adjustment of Occlusal Relationships," 1132
on "The Needs of Prosthetic Dentistry," 1130
on "When Shall Root-canals be Filled, and How?" 1134
Drill, use of, in tooth extraction, 1157
Dunbracco, W. W., on the conservation of the approximal interspaces, 1133

Education, dental, 1103
Essig, Norman S., "The Needs of Prosthetic Dentistry," 1108
Estey, Harold W., obituary of, 1165
Extraction, tooth, the drill in, 1157

Filling Teeth, Principles and Practice of, by C. N. Johnson (bibliographical), 1152
Focal infection, 1105

Gingivitis, 1090

Hardy, Geo. E., on nature's tolerance and compensating adjustments as they relate to oral restoration, 1139
Harris, C. C., on the conservation of the approximal interspaces, 1132

Infected root-canals, treatment of, 1078
Inlay, the gold, 1106
Inlay abutment, 1164

Johnson, C. N., "Principles and Practice of Filling Teeth" (bibliographical), 1152

Kelsey, H. E., on nature's tolerance and compensating adjustments as they relate to oral restoration, 1139
on primary factors in the etiology of periodontoclasia, 1136
King, J. M., "Vincent's Angina: Report of a Case," review of, 1159

Lateral teeth, variation in, 1110

McCall, John O., "Primary Factors in the Etiology of Periodontoclasia," 1084
on crown and bridge work, 1139
Major, R. H., "Multiple Primary Malignant Tumors," review of, 1162
Malformations, maxillo-dental-facial, 1159
Manila, dental clinics in, 1115
Maryland State Dental Association, proceedings of, 1130
Matrices for amalgam fillings, 1163
Meningitis, a case of, associated with the presence of bacillus fusiformis, 1160
Moffat, J. N. C., "Conduction Anesthesia," 1124
Montana Board of Examiners, 1172

New Jersey Board of Registration, 1173
North Carolina Board of Examiners, 1173

Ohio State Dental Society, 1172
Oklahoma Board of Examiners, 1173

Operative and prosthetic dental procedures, defective, 1088
Ottofy, Louis, "Dental Clinics in Manila," 1115

Pain of devitalized pulp, to relieve, 1162
Palate, hard, perforating ulcer of the, resembling tertiary syphilis, but due to a fuso-spirillary invasion, 1160
Paralysis, facial, in a syphilitic, 1160
Parotitis, experimental, 1160
Patents relating to dentistry, monthly record of, 1174
Pennsylvania Board of Examiners, 1173
Penrose, Clement A., "Some Experiences in the Camps and Fields of the Armies Overseas," 1119
Pericementoclasia, 1090
  abnormal systemic conditions an etiological factor of, 1089
  pathology of, 1090
  various types of, 1089
Periodontoclasia, primary tests in the etiology of, 1084
  malocclusion as a factor in, 1086
Periodontal disease, responsibility of the general practitioner in, 1092
Plaster, to remove, from vulcanite dentures, 1163
Plaster bite for bridge work, 1164
"Platinum - Iridium - Palladium" Regulations, rescinding of, 1171
Preventive dentistry, 1103
Preparedness League of American Dentists, 1169
Prinz, Hermann, "Sterilization of Root-canals," 1071
Prosthetic dentistry, needs of, 1108
Psychology of the child, 1164
Pulp devitalization, aseptic precautions in, 1101

Reconstruction, Dentistry in Relation to (editorial), 1149
Rescinding of "Platinum-Iridium-Palladium" Regulations, 1171
Re-sterilizing compound, instructions in, 1162
Rhode Island Board of Registration, 1174
Robin, Pierre, "Maxillo-dental-facial Malformations," review of, 1159
Root, a bad lateral, removing, 1163
Root-canal filling, technique of, 1099
Root-canals, culture methods for determining sterility of, 1094
  extent to which they should be filled, 1098
  selection of teeth in which they may be successfully filled, 1095
  sterilization of, 1071
  when and how shall they be filled? 1093

Sage, F. W., "'Self-limiting Action of Sulfuric Acid'" (correspondence), 1128
Sanz, E. F., "Facial Paralysis in a Syphilitic," review of, 1160
Sausser, E. R., on when and how root-canals should be filled, 1134
Scott, Robert M., "in memoriam" resolutions, 1165
Shurly, B. R., "Three Bronchoscopic Cases of Dentists' Origin," review of, 1158
Silicate cements, 1106
Smith, B. H., on the needs of prosthetic dentistry, 1131

Sulfuric acid in root-canals, 1127
self-limiting action of, 1128

TAYLOR, B. L., on primary factors in the etiology of periodontoclasia, 1137
on the filling of root-canals, 1135

Teeth, three basal types of, 1108

Thomson, St. Clair, "Tooth Impacted in a Secondary Bronchus of the Left Lung; Removal by Lower Bronchoscopy," review of, 1158

Tracy, W. D., "The Next Quarter Century in Dentistry," 1102

Trocar, a dental, 1154

Tumors, multiple primary malignant, 1162

Turnbull, J. A., "Anaphylaxis in Connection with Asthma, Hay Fever, and Various Skin Diseases," 1112

ULCER, perforating, of the hard palate, 1160

VINCENT'S angina, case of, 1159

Vulcanite dentures, removing plaster from, 1163

WAAS, M. J., "'Sulfuric Acid in Root-canals'" (correspondence), 1127

Wollstein, Martha, "Experimental Parotitis," review of, 1160

Worster-Drought, Cecil, "A Case of Meningitis Associated with the Presence of Bacillus Fusiformis," review of, 1160

Wright, G. H., on anaphylaxis in connection with asthma, hay fever, and various skin diseases, 1143

Wright, Wm. H., obituary of, 1165

JANUARY 1918 VOL. LX.—No. 1

THE DENTAL COSMOS

A MONTHLY RECORD
OF DENTAL SCIENCE

Devoted to the Interests of the Profession

EDITOR
EDWARD C. KIRK, D.D.S., Sc.D., LL.D.

ASSOCIATE EDITOR
L. PIERCE ANTHONY, D.D.S.

COLLEGE OF PHYSICIANS
LIBRARY
JAN 1 1918
OF PHILADELPHIA

PUBLISHED BY
THE S. S. WHITE DENTAL MANUFACTURING CO.
Chestnut Street, corner Twelfth, Philadelphia

Price, $1.00 a year, in advance Single Copies, 15 cents

Entered at the Post-Office at Philadelphia, Pa., as second-class matter

PRESS OF PATTERSON & WHITE CO., PHILA.

Contents for January 1918

Publication in the DENTAL COSMOS is not to be understood as indorsement—by the magazine or its publisher—of statements or opinions expressed by contributors of articles or by speakers in society discussions.

ORIGINAL COMMUNICATIONS

The Principles of Black's Cavity Preparation. By R. R. Byrnes, D.D.S. 1
The Histological Pathology of Alveolar Abscesses and Diseased Root-ends. By Kurt H. Thoma, D.M.D. 13
Electrobiolytic Theory of Dental Caries: Observations on the Presence of Galvanic Phenomena in the Mouth: with an Annotated Commentary on Related Topics. By Paul R. Manning, D.M.D. 26
Logical Asepsis in Dental Practice. By J. R. Callahan, D.D.S. 31
Movement of Teeth Predetermined by Engineering Instruments: Appliances Designed in Accordance with Analytical Mechanics. By Frederick L. Stanton, D.D.S. 39
Orthodontic Treatment of Advanced Cases, and Patients Coming from a Distance. By J. A. Cameron Hoggan, D.D.S., L.D.S. 45
Iodo-Glycerole. By Eugene S. Talbot, M.D., D.D.S. 50
A Dental Anomaly: Report of a Case of a Rudimentary Impacted Lower Third Molar. By Harry J. Feldman, D.D.S. 51

CORRESPONDENCE

Sterilization of Tooth Tissues with Silver Nitrate 52
Unclean Yet Sound Dentures 52
Dentistry as a Career 53

PROCEEDINGS OF SOCIETIES

New Jersey State Dental Society 54
Eastern Association of Graduates of the Angle School of Orthodontia 66
Dental Society of the State of New York 73

EDITORIAL DEPARTMENT

A Professional Appeal 81
Bibliographical 84
Review of Current Dental Literature 86
Periscope 91
Hints, Queries, and Comments 95

OBITUARY

Dr. Francis Leroy Satterlee 96
In Memoriam—Dr. Frank B. Clarke 96

ARMY AND NAVY DENTAL NEWS

(Page 97.)

SPECIAL NOTICE

Preparedness League of American Dentists 98

SOCIETY NOTES AND ANNOUNCEMENTS

American Institute of Dental Teachers 99
Chicago Dental Society 99
University of Iowa, College of Dentistry 99
Minnesota State Dental Association 99
Connecticut State Dental Association 99
Virginia State Dental Association 99
Boards of Dental Examiners 99, 100
Monthly Record of Patents relating to Dentistry 100
Subject Index for January ..... *following* 100

"Do Your Bit"

IF ever there was a time when good, skilful work on the part of dental practitioners was necessary, that time is now. The awakening of the people to the necessity of good teeth for the normal physical and mental development of children, from the standpoint of health and efficiency, is daily becoming more widespread through its own self-evidence. The demand of grown-ups for dental service naturally keeps pace, and conditions now put high-class dental service within the reach of many to whom heretofore it was a forbidden expenditure.

At the same time the ranks of the dentists have been considerably depleted by the absorption of a large number of practitioners into government service to keep the men of the army and navy "fit," so far as their teeth are concerned. So upon those who are left devolves the duty of upholding the honor of their profession,—its pledge of a sturdier, clearer-headed people, provided its teachings are followed. Proper care of the teeth from infancy on means sound teeth, normal development, and better average health individually, aggregating a national advance in the ability to do things.

Dentistry and the dental profession are under test. To make good, the best skill of every practitioner must be brought into play under the best possible auspices, with instruments that by their adaptability and materials that by their reliability will further his efforts to the utmost. It is no time for the employment of inferior tools. Only those that will help him to exhibit his best skill, to perfect it still further, that will enable him to get the best results possible in constantly increasing measure and in constantly lessening time, are admissible.

To the dentists upon whom in this emergency depends the task of upholding the value and advancing the triumphs of their art, emphatically "the best is the cheapest." Employing the best with their highest skill they cannot help but win. So may they prove by their works the inestimable benefit of skilful dental service,—"do their bit" in the upbuilding of a healthier, stronger race.

THE S. S. WHITE DENTAL MFG. CO.

"Since 1844 the Standard"

PHILADELPHIA

Work!

Thank God for the might of it,

The ardor, the urge, the delight of it—

Work that springs from the heart's desire,

Setting the brain and the soul on fire—

Oh, what is so good as the heat of it,

And what is so glad as the beat of it,

And what is so kind as the stern command,

Challenging brain and heart and hand?

* * * *

Thank God for a world where none may shirk—

Thank God for the splendor of work!

—ANGELA MORGAN

FEBRUARY 1918 VOL. LX.—No. 2

THE DENTAL COSMOS

A MONTHLY RECORD
OF DENTAL SCIENCE

Devoted to the Interests of the Profession

EDITOR
EDWARD C. KIRK, D.D.S., Sc.D., LL.D.

ASSOCIATE EDITOR
L. PIERCE ANTHONY, D.D.S.

OBSERVE REFLECT
COMPARE RECORD

PUBLISHED BY
THE S. S. WHITE DENTAL MANUFACTURING CO.
Chestnut Street, corner Twelfth, Philadelphia

Price, $1.00 a year, in advance Single Copies, 15 cents

Entered at the Post-Office at Philadelphia, Pa., as second-class matter

PRESS OF PATTERSON & WHITE CO., PHILA.

Contents for February 1918

Publication in the DENTAL COSMOS is not to be understood as indorsement—by the magazine or its publisher—of statements or opinions expressed by contributors of articles or by speakers in society discussions.

ORIGINAL COMMUNICATIONS

Impacted Lower Third Molars. By C. Edmund Kells, D.D.S. 101
Type *vs.* Temperament in the Selection of Teeth. (IV.) By Norman S. Essig, D.D.S. .. 108
Evolution of the Human Face: Chief Stages in Its Development from the Lowest Forms of Life to Man. By Wm. K. Gregory, Ph.D. 115
The Aims of the Subsection of Plastic and Oral Surgery. By Vilray P. Blair, Major M.R.C., U.S.A. 125
Dental Bibliography: The Need of an Index of Periodical Literature. By L. Pierce Anthony, D.D.S. 128
A Case of Nasal and Palatal Restoration. By George G. Bell, D.D.S. 131
An Experimental and Clinical Study of the Isolated Thyroid Hormone. By Nelson W. Janney, M.D., Ph.D. 133
The Relationship of Oral Secretions to Dental Caries: (I) Method of Determining the Amylolytic Index of Human Saliva. By Hermann Prinz, D.D.S., M.D. 140
Possible Relationship of Oral Focus to Chronic Osteomyelitis. (A Case Report.) By M. Hillel Feldman, D.D.S. 147

CORRESPONDENCE

Dental Service in France 148

PROCEEDINGS OF SOCIETIES

Northeastern Dental Association 150
Eastern Association of Graduates of the Angle School of Orthodontia 159

EDITORIAL DEPARTMENT

Jesse Cope Green 163
Proposed Legislation for Navy Dental Corps 166
Review of Current Dental Literature 167
Periscope 175

OBITUARY

Dr. Reuben Hollenback 180
Dr. Burford L. Shobe 180
Dr. Fred M. Smith 181
Announcement of death—Dr. John W. David 181

DENTAL LEGISLATION

Maine Dental Law Providing for Dental Hygienists 182

ARMY AND NAVY DENTAL NEWS

Circular: Navy Dental Reserve Corps 183
"Dental Treatment in the English Army" 186
Army Dental Corps: Examinations (250 vacancies) 188
Miscellaneous Items 189–192

SOCIETY NOTES AND ANNOUNCEMENTS

Psi Omega Fraternity 194
Marquette Dental Alumni Association 194
Vermont State Dental Society 194
Virginia State Dental Association 194
University of Iowa, College of Dentistry 194
Minnesota State Dental Association 194
Connecticut State Dental Association 194
Texas State Dental Society 194
Pennsylvania State Dental Society 195
Illinois State Dental Society 195
Kansas State Dental Association 195
Odontological Society of Western Pennsylvania 195
North Carolina Dental Society 195
Kentucky State Dental Association 195
Boards of Dental Examiners 195
Monthly Record of Patents relating to Dentistry 196
Subject Index for February ..... *following* 196

VULCOLOX
[Patented]

TEETH

Mean Sound Strength

The soundness of the strength afforded by the Vulcolox attachment is clearly understood by an analysis of its construction.

In the Vulcolox Tooth the porcelain diminishes gradually from the linguo-gingival margin. The shut is recessed from the ridge-lap almost to bite, with an overhanging rim of porcelain around three sides of the retention.

Within the recess is a single pin, fused into the labial wall, with its external head well inside the walls of porcelain. The recess and the pin form together the means of attachment, which is internal and interlocking with the stress distributed over its entire length.

The Vulcolox construction affords no element of weakness because it is based on correct engineering principles.

Your Dealer Will Supply You

Descriptive Booklet—*FREE* on request

The S. S. White Dental Mfg. Co.

"Since 1844 the Standard"

Philadelphia

What is S. S. White Silver Cement?

[Patented]

It is an efficient oxyphosphate
It is an effective germicide
It is practically non-discoloring
It is anodyne in character—allays pain
It is coagulant—self-limiting—seals the dentinal tubules

Silver Cement "A"—*Silver Chloride*
Silver Cement "B"—*Silver Phosphate*

Each has a definite purpose—Both are necessary in your practice

Prices

1 oz. pkg. "A" or "B"	**$2.00**
2 oz. Combination "A" and "B"	**3.50**

Your Dealer Will Supply You

"MAKING DENTAL CEMENTS GERMICIDAL"
A booklet of unusual interest—sent free on request

The S. S. White Dental Mfg. Co.
"Since 1844 the Standard"
Philadelphia

STACKS

MARCH 1918 VOL. LX.—No. 3

THE DENTAL COSMOS

A MONTHLY RECORD
OF DENTAL SCIENCE

Devoted to the Interests of the Profession

EDITOR
EDWARD C. KIRK, D.D.S., Sc.D., LL.D.

ASSOCIATE EDITOR
L. PIERCE ANTHONY, D.D.S.

OBSERVE REFLECT
COMPARE RECORD

LIBRARY

PUBLISHED BY
THE S. S. WHITE DENTAL MANUFACTURING CO.
Chestnut Street, corner Twelfth, Philadelphia

Price, $1.00 a year, in advance Single Copies, 15 cents

Entered at the Post-Office at Philadelphia, Pa., as second-class matter

PRESS OF PATTERSON & WHITE CO., PHILA.

Contents for March 1918

Publication in the DENTAL COSMOS is not to be understood as indorsement—by the magazine or its publisher—of statements or opinions expressed by contributors of articles or by speakers in society discussions.

ORIGINAL COMMUNICATIONS

The Relationship of Oral Secretions to Dental Caries: (II) Conditions Influencing the Quantity and Action of the Amylase Content of Human Saliva. By Hermann Prinz, D.D.S., M.D. 197
A Simple Form of Removable Bridge Work with Cast Clasps. By Norman B. Nesbett, D.M.D. 204
Selection of Anesthesia for Oral Surgical Operations, and the Roentgen Ray as an Aid in Diagnosis. By Kurt H. Thoma, D.M.D. 209
The Presence of Taste Fibers in the Lingual Nerve. By Isador H. Coriat, M.D. 217
The Relation of the Surgeon and the Dentist in Face and Jaw Injuries. By Herbert L. Wheeler, D.D.S. 220
Method of Taking Modeling Compound Impressions with the Mouth Closed and Under Normal Biting Strain. By John H. Drexler, D.D.S. 225
The Effect of Mouth Infections upon the General Health. By R. W. Bunting, D.D.S. 229
The Technique of Making Dental Radiographs. By Leuman M. Waugh, D.D.S. 232
The Influence of General Health on Oral Tissue. By Leroy M. S. Miner, M.D., D.M.D. 234
Oral Anesthesia. By Harold S. Vaughan, M.D., D.D.S. 238
Practical Sterilization for the Dentist. By Louis Meisburger, D.D.S. 240

CORRESPONDENCE

"Septic Teeth: Their Etiology and Surgical Treatment" 241

PROCEEDINGS OF SOCIETIES

Northeastern Dental Association 242
Academy of Stomatology of Philadelphia 250

EDITORIAL DEPARTMENT

Dental Scientific Literature 254
Bibliographical 257
Books received 258
Review of Current Dental Literature 258
Periscope 264

OBITUARY

Dr. James Beall Morrison 269
Dr. John W. David 270
Announcement of death—Dr. John R. Callahan 271

ARMY AND NAVY DENTAL NEWS

Proposed legislation for Navy Dental Corps 272
Physical examination of Registrants in the Army 274
Dental officers' promotion 275
Medical Corps instruction extended 275
Army Dental Corps: Appointments, assignments, etc. 275
Preparedness League of American Dentists 277

SPECIAL NOTICE

Reporting of Accidents from Local Anesthetics 281

SOCIETY NOTES AND ANNOUNCEMENTS

Coming dental meetings 282
Dental Library Association 283
Dental Society Notices 282–285
Boards of Dental Examiners 285, 286
Monthly Record of Patents relating to Dentistry 286
Subject Index for March ..... *following* 286

The Thomas W. Evans Museum and Dental Institute School of Dentistry University of Pennsylvania

The largest and most completely equipped dental educational institution in existence for the training of students for the practice of dentistry.

The course is graded and extends through four annual sessions, beginning the last Friday in September and ending the third Wednesday in June of each year. Every feature of practical value to the prospective practitioner is taught by a competent faculty aided by an efficient corps of demonstrators. It is the aim of the Institute to so conduct its educational work that those who pursue its courses leading to the degree Doctor of Dental Surgery shall be thoroughly grounded in the scientific principles upon which an intelligent and skillful practice of dentistry is based. A superabundance of clinical patients affords ample opportunity for the practical training of the students in all classes of dental operations.

The laboratories and operatorium are unsurpassed in equipment. The Institute is provided with every facility of the most modern and perfect type for laboratory work in connection with every department of dental instruction as well as for advanced scientific research.

A separate department for post-graduate instruction is provided wherein practitioners and special students are offered opportunity and facilities for training in the latest developments of dental science and art.

Catalogs and circulars giving detailed information furnished upon application. Address Dr. Charles R. Turner, Dean, The Thomas W. Evans Museum and Dental Institute, Fortieth and Spruce Streets, Philadelphia.

Consistence Consistency

The consistence of S. S. White Veneering Rubbers is such that they are extremely plastic, soft-working, easy packing.

So dense that when made into very thin veneers the base rubber does not penetrate them during vulcanization; not so dense as to prevent maximum flow.

So tough that when vulcanized they have a horn-like texture of great strength. They trim smooth and clean, do not fracture or drag under the instrument, will not crumble away in the mouth.

The shades, Pink (dark), Pink "A" (light), Pink "B" (bluish), cover a wide field. Properly vulcanized these colors are intensified, their vital appearance accentuated.

The consistency with which these essential characteristics are maintained, one lot after another, clinches the value of S. S. White Veneering Rubbers and establishes their reliability.

S. S. White Veneering Rubbers

Pink (Dark) Pink A (Light) Pink B (Bluish)

In half-pound boxes, per pound $6.00

You can profit by purchasing these Rubbers in quantities—rates on application

Your Dealer Will Supply You

The S.S.WHITE DENTAL MFG. Co.

"Since 1844 the Standard"

PHILADELPHIA

APRIL 1918 VOL. LX.—No. 4

Stucks

THE DENTAL COSMOS

A MONTHLY RECORD
OF DENTAL SCIENCE

Devoted to the Interests of the Profession

EDITOR
EDWARD C. KIRK, D.D.S., Sc.D., LL.D.

ASSOCIATE EDITOR
L. PIERCE ANTHONY, D.D.S.

COLLEGE OF PHILADELPHIA
APR 4 1918
LIBRARY

OBSERVE REFLECT
COMPARE RECORD

PUBLISHED BY
THE S. S. WHITE DENTAL MANUFACTURING CO.
211 SOUTH TWELFTH STREET, PHILADELPHIA

Price, $1.00 a year, in advance Single Copies, 15 cents

Entered at the Post-Office at Philadelphia, Pa., as second-class matter

PRESS OF PATTERSON & WHITE CO., PHILA.

Contents for April 1918

Publication in the DENTAL COSMOS is not to be understood as indorsement—by the magazine or its publisher—of statements or opinions expressed by contributors of articles or by speakers in society discussions.

ORIGINAL COMMUNICATIONS

The Relationship of Oral Secretions to Dental Caries: (III) Ferments of Human Saliva Other Than Amylase. By Heermann Prinz, D.D.S., M.D. 287
Effects of Decayed Teeth upon a Child's Progress in School. By Earle E. Johnson, D.D.S. 293
Vincent's Angina from the Oral Surgical Standpoint. By Harry A. Haines, D.D.S. 296
Apothesine, the New Local Anesthetic: The Revised Technique of Pterygo-mandibular Injection. By J. S. Shields, D.D.S. 298
Brief Review of Current Dental Literature. By L. P. Anthony, D.D.S. 301
The Bearing of Physical Anthropology on the Problems of Orthodontia. By L. R. Sullivan, M.A. 305
Importance of Dental Supervision During Pregnancy. By J. Clarence Salvas, D.D.S. .. 314
The Conservation and Utilization of Cicatricial Bands in the Treatment of Jaw Fractures Involving Extensive Loss of Substance. By MM. Gernez and Lemière 316
Report of a Case of Follicular Dental Cyst. By R. E. Denney, D.D.S. 319
Traumatism Due to Faulty Co-ordinating Bridge Work. By Paul R. Stillman, D.D.S. .. 321
Indirect-Direct Gold Inlay Method. By M. J. Waas, D.D.S. 328

Engineering Principles Applied to Dentistry. By F. L. Stanton, D.D.S. 336

CORRESPONDENCE

A Case of Tooth Gemination 330
Illustration—Dentistry and the War: American Ambulance Hospital at Neuilly, dental department 330

PROCEEDINGS OF SOCIETIES

Eastern Association of Graduates of the Angle School of Orthodontia 331
Academy of Stomatology of Philadelphia 334
Northeastern Dental Association 336

EDITORIAL DEPARTMENT

Pending Navy Dental Legislation 344
"l'Aide Confraternelle" Honor Roll 348
Bibliographical 349
Review of Current Dental Literature 351
Periscope 355
Hints, Queries, and Comments 360

OBITUARY

Dr. John R. Callahan 360
Dr. Joseph Lemuel Mewborn 361
Dr. Robert Hopkins Moffitt 364
"In memoriam"—Dr. Fred M. Smith 364

DENTAL LEGISLATION

Proposed Legislation for the Navy Dental Corps 365

ARMY AND NAVY DENTAL NEWS

Army and Navy News and Notes 367–370
Preparedness League of American Dentists 371–373

SPECIAL NOTICE

Proposed Dental Library Association 373

SOCIETY NOTES AND ANNOUNCEMENTS

Coming dental meetings 374
National Association of Dental Faculties 375
American Society of Orthodontists 375
Other Dental Society Notices 375–379
Boards of Dental Examiners 379–380
Monthly Record of Patents relating to Dentistry 380
Subject Index for April ..... *following* 380

University of Buffalo College of Dentistry

Session of 1918-1919

September 24 to June 18

THE course in dentistry is one of four years. The first and second years are devoted to the fundamental studies of medicine and dental technic, while in the third and fourth years, the greater part of the time is spent in the general practice of dentistry. There is an abundance of clinical material, which gives a student a rare opportunity to become familiar with all classes of dental operations.

For further information address

Dr. Daniel H. Squire, Dean

25 Goodrich Street, Buffalo, N. Y.

VULCOLOX
PATENTED

TEETH

Natural Conformation

In a natural incisor the crown portion increases rapidly in its labio-lingual diameter from just beyond the cutting-edge to the line where it merges into the root. The root portion tapers gradually from this line to the apex.

Vulcolox Teeth approximate this natural form—have the rapid increase from cutting-edge to gum line, the gradual taper beyond the gum.

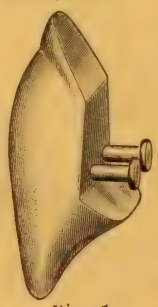


Fig. 1

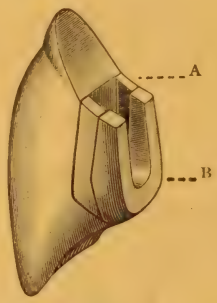


Fig. 2

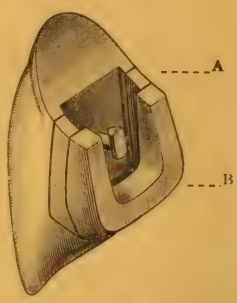


Fig. 3

The advantage of the Vulcolox Tooth is well shown in the illustrations. Take a two-pin vulcanite tooth (Fig. 1), remove the pins, and superimpose upon it a porcelain arch A (Fig. 2), and you have built-up the porcelain of the "shut" almost to the height of the pin-guard. Add another arch (B) of such size as to overhang the first one internally, and you have built up the porcelain beyond the pin-guard and formed the recess of the Vulcolox Tooth (Fig. 2). Cut-out the floor of the recess a little, insert a pin and you have the Vulcolox Tooth complete (Fig. 3).

The sharp cut in the porcelain behind the pin-guard is thus avoided, and the tooth given a natural conformation, a gradual slope from the gum line to the shoulder. This natural conformation strengthens the tooth, gives a better esthetic effect, and permits arrangement of the teeth in any desirable alignment.

Your Dealer Will Supply You

Descriptive booklet free on request

The S. S. White Dental Mfg. Co.

"Since 1844 the Standard"

Philadelphia

MAY 1918 VOL. LX.—No. 5

THE DENTAL COSMOS

A MONTHLY RECORD
OF DENTAL SCIENCE

Devoted to the Interests of the Profession

EDITOR
EDWARD C. KIRK, D.D.S., Sc.D., LL.D.

ASSOCIATE EDITOR
L. PIERCE ANTHONY, D.D.S.

COLLEGE OF PHYSICIANS LIBRARY

OBSERVE REFLECT
COMPARE RECORD

PUBLISHED BY
THE S. S. WHITE DENTAL MANUFACTURING CO.
211 SOUTH TWELFTH STREET, PHILADELPHIA

Price, $1.00 a year, in advance Single Copies, 15 cents

Entered at the Post-Office at Philadelphia, Pa., as second-class matter

PRESS OF PATTERSON & WHITE CO., PHILA.

Contents for May 1918

Publication in the DENTAL COSMOS is not to be understood as indorsement—by the magazine or its publisher—of statements or opinions expressed by contributors of articles or by speakers in society discussions.

ORIGINAL COMMUNICATIONS

The Technique of Root Restoration. By Hermann Prinz, D.D.S., M.D. 381
The Nature of the Orthodontic Problem. By A. LeRoy Johnson, D.M.D. 394
Restorations with Jacket Crowns. By J. F. Hovestad, D.M.D. 402
Restoration of Abnormal Mouths by Surgical Treatment Before Inserting Plates. By James P. Ruyl, D.D.S. 414
The Evolution of Orthodonty. By Wm. K. Gregory, Ph.D. 417
On Healthy and Diseased Conditions of the Alveolar Processes of the Jaws. By A. Hopewell-Smith, L.R.C.P., M.R.C.S., L.D.S. 426
Radiolucency of Chloro-percha in the Radiograph. By W. Clyde Davis, M.D., D.D.S. .. 433

CORRESPONDENCE

The Naval Dental Surgeon At Work 434

PROCEEDINGS OF SOCIETIES

Eastern Association of the Graduates of the Angle School of Orthodontia 435

EDITORIAL DEPARTMENT

Dentistry in the New Era 441
Bibliographical 445
Review of Current Dental Literature 447
Periscope 452

OBITUARY

Dr. Isaac H. Davis 456
Dr. Lyman C. Bryan 457
Dr. Wm. Mortimer Zirkle 457

ARMY AND NAVY

Army and Navy Dental News and Notes 459–463
Preparedness League of American Dentists 464

SOCIETY NOTES AND ANNOUNCEMENTS

List of Coming Dental Meetings 466
Delta Sigma Delta Fraternity 467
American Society of Orthodontists 467
National Association of Dental Faculties 467
Eastern Association of Graduates of the Angle School of Orthodontia 467
American Medical Association—Section on Stomatology 468
Other Dental Society Notices 467–470
Boards of Dental Examiners 470–472
Monthly Record of Patents relating to Dentistry 472
Subject Index for May ..... *following* 472

The Thomas W. Evans Museum and Dental Institute School of Dentistry University of Pennsylvania

The largest and most completely equipped dental educational institution in existence for the training of students for the practice of dentistry.

The course is graded and extends through four annual sessions, beginning the last Friday in September and ending the third Wednesday in June of each year. Every feature of practical value to the prospective practitioner is taught by a competent faculty aided by an efficient corps of demonstrators. It is the aim of the Institute to so conduct its educational work that those who pursue its courses leading to the degree Doctor of Dental Surgery shall be thoroughly grounded in the scientific principles upon which an intelligent and skillful practice of dentistry is based. A superabundance of clinical patients affords ample opportunity for the practical training of the students in all classes of dental operations.

The laboratories and operatorium are unsurpassed in equipment. The Institute is provided with every facility of the most modern and perfect type for laboratory work in connection with every department of dental instruction as well as for advanced scientific research.

A separate department for post-graduate instruction is provided wherein practitioners and special students are offered opportunity and facilities for training in the latest developments of dental science and art.

Catalogs and circulars giving detailed information furnished upon application. Address Dr. Charles R. Turner, Dean, The Thomas W. Evans Museum and Dental Institute, Fortieth and Spruce Streets, Philadelphia.

That Government of the people, by the people, and for the people shall not perish from the earth

(*Abraham Lincoln*)

Become A Partner With Your Government

"Every dollar subscribed to the Liberty Loan is a dollar invested in American manhood. Every dollar subscribed as the result of self-denial means partnership in the hardships and risks of our men in the trenches. Every dollar subscribed will confirm the determination of our people at home to stand by its army to a victorious end. An overwhelming subscription to the Third Liberty Loan will be a patriotic expression of confidence in our ability as a nation to maintain all that we hold dear in civilization."

(*Cablegram from General Pershing*)

JUNE 1918 VOL. LX.—No. 6

THE DENTAL COSMOS

A MONTHLY RECORD
OF DENTAL SCIENCE

Devoted to the Interests of the Profession

EDITOR
EDWARD C. KIRK, D.D.S., Sc.D., LL.D.

ASSOCIATE EDITOR
L. PIERCE ANTHONY, D.D.S.

OBSERVE REFLECT
COMPARE RECORD

PUBLISHED BY
THE S. S. WHITE DENTAL MANUFACTURING CO.
211 SOUTH TWELFTH STREET, PHILADELPHIA

Price, $1.00 a year, in advance Single Copies, 15 cents

Entered at the Post-Office at Philadelphia, Pa., as second-class matter

PRESS OF PATTERSON & WHITE CO., PHILA.

Contents for June 1918

Publication in the DENTAL COSMOS is not to be understood as indorsement—by the magazine or its publisher—of statements or opinions expressed by contributors of articles or by speakers in society discussions.

ORIGINAL COMMUNICATIONS

Replanting *vs.* Apicoectomy. By C. Edmund Kells, D.D.S. 473
Dental Engineering and the Normal Arch. By Percy N. Williams, D.D.S. 483
Asepsis *vs.* Antisepsis in Root-canal Procedure. By David W. McLean, D.D.S. 491
Standardization of Root-canal Work. By Milton J. Waas, D.D.S. 498
The Practice of Dentistry in the Army and in Civil Life: A Comparison. By Lieut. K. F. Smith, D.R.C. 504
A Preliminary Report upon the Temporo-mandibular Articulation in the Human Type. By H. J. Prentiss, M.D. 505
The Importance of the Inter-articular Fibro-cartilage of the Temporo-mandibular Articulation. By Richard Summa, D.D.S. 512
Collapse under Anesthesia due to an Enlarged Thymus Gland. By Isador H. Coriat, M.D. 515
A Type of Denture for Army Use. By Lieut. E. H. Raymond, M.C., U.S.R. 516

CORRESPONDENCE

More Anent Standardization 519
"Technique of Root Amputation" 520

EDITORIAL DEPARTMENT

Industrial Dental Service 521
A Correction 524
Bibliographical 524
Review of Current Dental Literature 527
Periscope 534
Hints, Queries, and Comments 539

OBITUARY

Dr. Arwed Retter 540
Notice of death—Dr. A. R. Eaton 540

ARMY AND NAVY

Army and Navy Dental News and Notes 541
Preparedness League of American Dentists 544

SPECIAL NOTICE

Forsyth Dental Infirmary for Children 545

SOCIETY NOTES AND ANNOUNCEMENTS

List of Coming Dental Meetings 546
American Medical Association—Section on Stomatology 547
National Dental Association 548
National Association of Dental Examiners 549
National Association of Dental Faculties 549
American Society of Orthodontists 549
Delta Sigma Delta Fraternity 549
Other Dental Society Notices 549–551
Boards of Dental Examiners 551–554
Monthly Record of Patents relating to Dentistry 554
Subject Index for June ..... *following* 554

University of Buffalo College of Dentistry

Session of 1918-1919

September 24 to June 18

THE course in dentistry is one of four years. The first and second years are devoted to the fundamental studies of medicine and dental technic, while in the third and fourth years, the greater part of the time is spent in the general practice of dentistry. There is an abundance of clinical material, which gives a student a rare opportunity to become familiar with all classes of dental operations.

For further information address

Dr. Daniel H. Squire, Dean

25 Goodrich Street, Buffalo, N. Y.

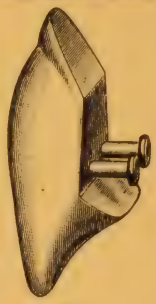


Fig. 1

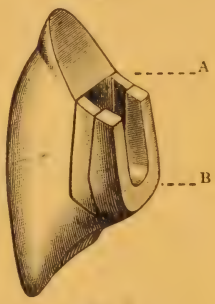


Fig. 2

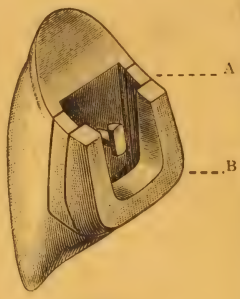


Fig. 3

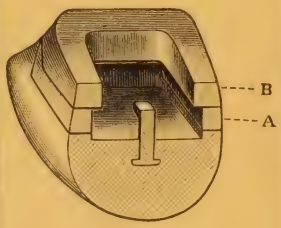


Fig. 4

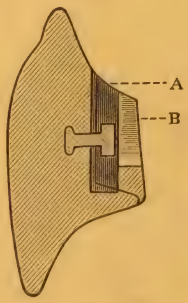


Fig. 5

VULCOLOX

[PATENTED]

TEETH

The Attachment that Guards Every Point

Building-up the two-pin tooth (Fig. 1) to the Vulcolox shape (Fig. 2) provides first, an ideal form for the tooth,—a form that permits any desired arrangement without exposing the attachment.

It provides, second, a means of attachment to the plate unapproached in strength,—an interlocking of porcelain and vulcanite that assures retention under all circumstances.

This interlocking attachment has been proved much the strongest known against the usual stress of biting —a stress that is exerted from within outward.

Another stress to which the tooth is subjected is inward and vertical, as in masticating taffy or in chewing gum. The guard for this is a double-headed pin with half its length and its flanged head fused in the porcelain, the other half with a tee-shaped head extending into the recess lengthwise of the tooth to the height of the first arch (Fig. A). When imbedded in the vulcanite it equalizes the resistance to stress.

The relations of the pin to the recess, the extent of the mass of vulcanite that imbeds it, and the interlocking character of the attachment are well seen in Figs. 4 and 5. Every retention requirement is met, every stress provided for.

For Sale by all Dealers

Descriptive Literature free on request to

The S. S. White Dental Mfg. Co.

"Since 1844 the Standard"

Philadelphia

JULY 1918 VOL. LX.—No. 7

THE DENTAL COSMOS

A MONTHLY RECORD
OF DENTAL SCIENCE

Devoted to the Interests of the Profession

EDITOR
EDWARD C. KIRK, D.D.S., Sc.D., LL.D.

ASSOCIATE EDITOR
L. PIERCE ANTHONY, D.D.S.

OBSERVE REFLECT
COMPARE RECORD

PUBLISHED BY
THE S. S. WHITE DENTAL MANUFACTURING CO.
211 SOUTH TWELFTH STREET, PHILADELPHIA

rice, $1.00 a year, in advance Single Copies, 15 cents

Entered at the Post-Office at Philadelphia, Pa., as second-class matter

PRESS OF PATTERSON & WHITE CO., PHILA.

Contents for July 1918

Publication in the DENTAL COSMOS is not to be understood as indorsement—by the magazine or its publisher—of statements or opinions expressed by contributors of articles or by speakers in society discussions.

ORIGINAL COMMUNICATIONS

Cysts of the Dental System. By Kaethe W. Dewey, M.D. 555
The Nature of Pericemental Abscesses upon Vital Teeth. By Dr. Maurice Roy 570
The Pathology, Etiology, and Treatment of Pyorrhea. By Arthur H. Merritt, D.D.S. .. 574
Surgical Correction of a Double Hare-lip, Alveolar Cleft, and Cleft of Hard and Soft Palate. By M. N. Federspiel, B.Sc., D.D.S., M.D. 581
The Rôle of Sepsis and of Antisepsis in Medicine. By Wm. Hunter, M.D. 585
Improved Method of Casting Splints and Use of Headgear in Treating Fractured Jaws. By James Edward Aiguier, Ph.G., D.D.S. 602

CORRESPONDENCE

Radiolucency of Chloro-percha in the Radiograph 611
"Iodo-Glycerole" 612
Replantation of Teeth 613
"Technique of Root Amputation" 613

PROCEEDINGS OF SOCIETIES

Academy of Stomatology of Philadelphia 614

EDITORIAL DEPARTMENT

Oral Sepsis 621
"l'Aide Confraternelle" Honor Roll 624
Bibliographical 625
Review of Current Dental Literature 629
Periscope 634

OBITUARY

Dr. Alvin R. Eaton 638
Dr. Rufus W. Carroll 639
In memoriam—Dr. Isaac H. Davis 639
Dr. John H. London 640

DENTAL COLLEGE COMMENCEMENTS

(Pages 641–643.)

DENTAL LEGISLATION AND LEGAL DECISIONS

New Jersey: Law Authorizing the Establishment of Free Dental Clinics in Municipalities 644
New York: Oral Hygiene Ordinance for New York City 644
Missouri: St. Louis Court of Appeals—Decision in "Negligence in Sterilizing Instruments: Blood Poisoning" 645

ARMY AND NAVY DENTAL NEWS

Army and Navy Dental News and Notes 647
Preparedness League of American Dentists 651

SPECIAL NOTICE

Notice to the Graduates of the Pennsylvania College of Dental Surgery 654

SOCIETY NOTES AND ANNOUNCEMENTS

List of Coming Dental Meetings 655
National Dental Association 656
Canadian Dental Association 657
National Association of Dental Examiners 657
National Association of Dental Faculties 657
American Society of Orthodontists 657
American Academy of Oral Prophylaxis and Periodontology 657
Delta Sigma Delta Fraternity 657
Psi Omega Fraternity 657
Other Dental Society Notices 655, 657
Boards of Dental Examiners 658
Subject Index for July ..... *following* 658

To the

Dentists of the World

WE are very pleased to be able to announce to you that through the kindness of the National Dental Association, the exhibits of dental goods to be held in connection with the next annual meeting of the National Dental Association to be held in the Auditorium Hotel in Chicago, Ill., August 5th, 6th, 7th, 8th and 9th, will be open to ALL dentists, and a cordial invitation is extended to you to attend what will be the most complete scientific dental exhibit ever held.

The exhibit will open Monday, August 5th, at 1 p. m.

SEE EVERYTHING NEW IN DENTISTRY

War and Quality Standards

Notwithstanding the present difficulties in obtaining raw materials, in spite of the shortage of skilled labor coupled with the necessity of pushing production, we are maintaining the same high manufacturing standards in

S. S. White
Improved Dental Rubbers
(Balanced Formulæ)

Not a single step is taken in their manufacture without a good reason—nothing is left to chance. First, a sure method of proper compounding—the balanced formulæ. Finally, careful workers who keep the faith of "QUALITY and UNIFORMITY."

Buy S. S. White Rubbers and you can rely on them as fit working companions. They are soft-working, can be easily packed; vulcanize into dense horn-like plates which have lightness, strength and vital appearance.

Made in Twelve Colors

Your Dealer Will Supply You

"Packing Suggestions," a booklet worth a permanent place in your files, is free on request.

THE S.S.WHITE DENTAL MFG. CO.

"Since 1844 the Standard"

PHILADELPHIA

AUGUST 1918 VOL. LX.—No. 8

THE DENTAL COSMOS

A MONTHLY RECORD
OF DENTAL SCIENCE

Devoted to the Interests of the Profession

EDITOR
EDWARD C. KIRK, D.D.S., Sc.D., LL.D.

ASSOCIATE EDITOR
L. PIERCE ANTHONY, D.D.S.

OBSERVE REFLECT
COMPARE RECORD

PUBLISHED BY
THE S. S. WHITE DENTAL MANUFACTURING CO.
211 SOUTH TWELFTH STREET, PHILADELPHIA

Price, $1.00 a year, in advance Single Copies, 15 cents

Entered at the Post-Office at Philadelphia, Pa., as second-class matter

PRESS OF PATTERSON & WHITE CO., PHILA.

Contents for August 1918

Publication in the DENTAL COSMOS is not to be understood as indorsement—by the magazine or its publisher—of statements or opinions expressed by contributors of articles or by speakers in society discussions.

ORIGINAL COMMUNICATIONS

The Pathogenesis and Prophylaxis of Pyorrhea Alveolaris. By Dr. Maurice Roy 659
The Principles Governing the Construction of Permanent Fixatures in the Treatment of Pyorrhea Alveolaris: With a New Method of Construction. By Dr. Karl Elander 671
Non-cohesive Gold. By L. Ashley Faught, D.D.S. 685
Hemorrhage and Its Treatment. By Wm. Francis Drea, D.M.D. 688
A Comparison of Office Policies, with Special Reference to Pulp Exposure or Death. By Otto E. Inglis, D.D.S. 692
Interpretation of Roentgenograms. By Thomas B. Wade, D.D.S. 695
Minimum Requirements for Class "A" Dental Schools adopted by the Dental Educational Council of America. By Henry L. Banzhaf, B.S., D.D.S. 701
The Dental Clinic in the National Army Cantonment. By Malcolm W. Bayley 704

CORRESPONDENCE

"Radiolucency of Chloro-percha" 708
Scurvy-like Pyorrhea at "the Front" 709
A Case of Ptosis as the Result of Pulpitis 709

PROCEEDINGS OF SOCIETIES

Academy of Stomatology of Philadelphia 710

EDITORIAL DEPARTMENT

The *Status Præsens* 723
Bibliographical 715
Review of Current Dental Literature 717
Periscope 726

OBITUARY

Dr. Thomas C. Stellwagen 731
Dr. Henry B. Nones 732
Dr. Louis A. O'Brian 732

DENTAL LEGISLATION AND LEGAL DECISIONS

Naval Appropriation Bill—Provision for the Naval Dental Corps 733
Cassius M. Carr Patent Void 734
Dentists' Mutual Protective Alliance Wins in Taggart Case 735

DENTAL COLLEGE COMMENCEMENTS

(Pages 736–747.)

ARMY AND NAVY DENTAL NEWS

Army and Navy Dental News and Notes 748
Preparedness League of American Dentists 752

SOCIETY NOTES AND ANNOUNCEMENTS

National Dental Association 754
Canadian Dental Association 756
American Academy of Oral Prophylaxis and Periodontology 756
American Society of Orthodontists 756
National Association of Dental Examiners 757
National Association of Dental Faculties 757
Delta Sigma Delta Fraternity 757
Psi Omega Fraternity 757
Harvard-Tufts Training School for Dental Hygienists 757
Forsyth Training School for Dental Hygienists 757
Geo. B. Winter Exodontia Club 758
Iowa Board of Examiners 758
Monthly Record of Patents relating to Dentistry 758
Subject Index for August ..... *following* 758

University of Buffalo College of Dentistry

Session of 1918-1919

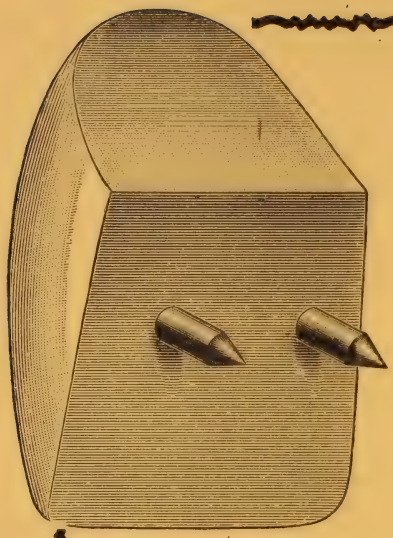
September 24 to June 18

THE course in dentistry is one of four years. The first and second years are devoted to the fundamental studies of medicine and dental technic, while in the third and fourth years, the greater part of the time is spent in the general practice of dentistry. There is an abundance of clinical material, which gives a student a rare opportunity to become familiar with all classes of dental operations.

For further information address

Dr. Daniel H. Squire, Dean

25 Goodrich Street, Buffalo, N. Y.



S. S. White Pointed-Pin Facings

The introduction of Platinum-Palladium-Gold Pointed Pins in S. S. White Facings is a direct benefit to the United States Government as well as to the dental profession.

IT saves platinum for Government use, cuts down the cost of the facings, and improves their adaptability for crown-and-bridge work. The dentist's time is saved, because no plate punch is required; the pointed pins punch their own holes, of the proper size and in correct position in the backing. Accurate adaptation of gold to porcelain is thus facilitated, the flowing of flux through the perforations, a fruitful cause of checking, is prevented; and better, more satisfactory work is assured with less labor.

S. S. White Pointed-Pin Facings can be successfully used in gold soldering operations. The pins can be bent over or cut off as desired. The porcelain has long been the standard of the profession, and the molds and shades are well known for their naturalness by crown-and-bridge workers.

Incisors, bicuspids and molars are carded as sets of four, cuspids as two pairs on individual cards

PRICES

Singly	$25.00 lots	$100.00 lots
$0.50	$0.47½ each	$0.45 each

Assortment 370 Facings in Case $166.50

Subject to our Regular Cash Discounts—Prices are subject to change without notice

For sale by Dealers and at our Houses
Illustrated Folders Free on Request

The S. S. White Dental Manufacturing Co.

"Since 1844 the Standard"

Philadelphia

SEPTEMBER 1918

VOL. LX.—No. 9

THE DENTAL COSMOS

A MONTHLY RECORD
OF DENTAL SCIENCE

Devoted to the Interests of the Profession

EDITOR
EDWARD C. KIRK, D.D.S., Sc.D., LL.D.

ASSOCIATE EDITOR
L. PIERCE ANTHONY, D.D.S.

OBSERVE REFLECT
COMPARE RECORD

PUBLISHED BY
THE S. S. WHITE DENTAL MANUFACTURING CO.
211 SOUTH TWELFTH STREET, PHILADELPHIA

Price, $1.00 a year, in advance

Single Copies, 15 cents

Entered at the Post-Office at Philadelphia, Pa., as second-class matter

PRESS OF PATTERSON & WHITE CO., PHILA.

Contents for September 1918

Publication in the DENTAL COSMOS is not to be understood as indorsement—by the magazine or its publisher—of statements or opinions expressed by contributors of articles or by speakers in society discussions.

ORIGINAL COMMUNICATIONS

The Pathogenesis and Prophylaxis of Pyorrhea Alveolaris. (II.) By Dr. Maurice Roy 759
Conservation of Time in Teaching Dental Students. By Eugene S. Talbot, M.D., D.D.S. 772
Cancer of the Oral Cavity. By L. Duncan Bulkley, A.M., M.D. 774
The First Line Trench in Dentistry. By M. Evangeline Jordon, D.D.S. 777
The Pathogenesis and Treatment of Pyorrhea Alveolaris. By B. Kritchevsky and P. Séguin 781
Success in Oral Restoration: What are the Fundamental Principles upon Which It Must be Based? By Jas. Kendall Burgess, D.D.S. 785
The Diagnosis of Malocclusion in Its Early Stages. By Frank A. Delabarre, A.B., D.D.S., M.D. 789
History of the Dental Society of the State of New York. By Wm. Carr, D.D.S. 793
The Conversion of India Rubber into Vulcanite. By Geo. B. Snow, D.D.S. 800
Dentistry After the War: A Promising Professional Field for Young Men. By Edwin N. Kent, D.M.D. 806

President's Address (Dental Society of the State of New York). By Amos C. Rich, D.D.S. 809

CORRESPONDENCE

"A Case of Tooth Gemination" 807
"Radiolucency of Chloro-percha in the Radiograph" 808

PROCEEDINGS OF SOCIETIES

Dental Society of the State of New York 809
Connecticut State Dental Association 815

EDITORIAL DEPARTMENT

Co-operation in Scientific Research 821
The Greene Vardiman Black Memorial 824
Transactions of the Inter-Allied Dental Congress 826
Bibliographical 827
Review of Current Dental Literature 829
Periscope 838

OBITUARY

Leon VanderWhite—W. Reinoehl 842
Dr. Ammon Osgood 842

DENTAL COLLEGE COMMENCEMENTS

(Pages 844 to 849.)

ARMY AND NAVY DENTAL NEWS

Army and Navy Dental News and Notes 850
Preparedness League of American Dentists 853

SPECIAL NOTICE

Vacancies in the Examining Corps of the Patent Office 855

SOCIETY NOTES AND ANNOUNCEMENTS

Northeastern Dental Association 856
Susquehanna Dental Association of Pennsylvania 856
Preparedness League—Cleveland Unit 856
Massachusetts Board of Examiners 856
Subject Index for September ..... *following* 856

The Thomas W. Evans Museum and Dental Institute School of Dentistry University of Pennsylvania

The largest and most completely equipped dental educational institution in existence for the training of students for the practice of dentistry.

The course is graded and extends through four annual sessions, beginning the last Friday in September and ending the third Wednesday in June of each year. Every feature of practical value to the prospective practitioner is taught by a competent faculty aided by an efficient corps of demonstrators. It is the aim of the Institute to so conduct its educational work that those who pursue its courses leading to the degree Doctor of Dental Surgery shall be thoroughly grounded in the scientific principles upon which an intelligent and skillful practice of dentistry is based. A superabundance of clinical patients affords ample opportunity for the practical training of the students in all classes of dental operations.

The laboratories and operatorium are unsurpassed in equipment. The Institute is provided with every facility of the most modern and perfect type for laboratory work in connection with every department of dental instruction as well as for advanced scientific research.

A separate department for post-graduate instruction is provided wherein practitioners and special students are offered opportunity and facilities for training in the latest developments of dental science and art.

Catalogs and circulars giving detailed information furnished upon application. Address Dr. Charles R. Turner, Dean, The Thomas W. Evans Museum and Dental Institute, Fortieth and Spruce Streets, Philadelphia.

The Conservation of Platinum in Bridgework

It needs no words of ours to demonstrate to dentists the necessity of bridgework. For well on to forty years,—ever since its advantages were exploited,—it has been recognized as the standard means for restoring masticatory efficiency in many cases for which there is no other adequate relief. It has become as much a part of general dental practice as operative or plate work, is taught in the colleges on precisely the same lines; is, as a consequence a co-ordinate branch of practice, lacking a knowledge of which the dentist's education is not complete.

Aside from the new cases presenting every day, there are hundreds of thousands of bridges in the mouths of patients for which repairs have to be made. Porcelain Facings for all this work must have pins that will resist — without oxidizing — the temperature necessary to fuse the porcelain; but more particularly, that will, while withstanding the soldering heat necessary in backing and attaching them, form a perfect joint with the solder by surface alloying. No base metal will do this.

Platinum only has heretofore met these conditions; but stimulated by the shortage of available platinum induced by the Government's needs, we have devised an alloy of platinum, palladium and gold, that has a fusing point near enough to that of platinum to stand the high firing and soldering heats required.

The alloy is tough and strong, makes pins that are rigid without being brittle, and that form the required perfect joint with the solder. The pins are pointed, punch their own holes, and afford all the advantages of close fit and accurate adaptation of backing to pins and porcelain.

S. S. WHITE POINTED-PIN FACINGS introduce these platinum-palladium-gold pointed pins. The strength, translucency and natural shades of the porcelain and the satisfying mold forms have long been familiar to crown-and-bridge workers.

PRICES

Singly	$100.00 Lots	370 Asst. in case
$0.50	$0.45 each	$166.50

For Sale by Dental Dealers and at our Houses

THE S. S. WHITE DENTAL MFG. CO.

"Since 1844 the Standard"

PHILADELPHIA

OCTOBER 1918 VOL. LX.—No. 10

THE DENTAL COSMOS

A MONTHLY RECORD
OF DENTAL SCIENCE

Devoted to the Interests of the Profession

EDITOR
EDWARD C. KIRK, D.D.S., Sc.D., LL.D.

ASSOCIATE EDITOR
L. PIERCE ANTHONY, D.D.S.

OBSERVE REFLECT
COMPARE RECORD

PUBLISHED BY
THE S. S. WHITE DENTAL MANUFACTURING CO.
211 SOUTH TWELFTH STREET, PHILADELPHIA

Price, $1.00 a year, in advance Single Copies, 15 cents

Entered at the Post-Office at Philadelphia, Pa., as second-class matter

PRESS OF PATTERSON & WHITE CO., PHILA.

Contents for October 1918

Publication in the DENTAL COSMOS is not to be understood as indorsement—by the magazine or its publisher—of statements or opinions expressed by contributors of articles or by speakers in society discussions.

ORIGINAL COMMUNICATIONS

Exercises for the Development of the Muscles of the Face, with a View to Increasing Their Functional Activity. By Alfred P. Rogers, D.D.S. 857
Careful Technique the Greatest Factor in the Construction of Full Upper and Lower Dentures. By Alexander H. Paterson, D.D.S. 876
The Past and Present of Operative Dentistry. By B. Holly Smith, D.D.S. 884
Topics of the Day: Curetting, Ionization, Pulp Testing. By C. Edmund Kells, D.D.S. 888
Report of the Committee on Practice—Dental Society of the State of New York. By Paul R. Stillman, D.D.S. 893
Physiological Age: The Relation of Dentition to Body Growth. By Leslie Spier 899
Band of a Gold Crown in the Bronchus: Report of a Case. By Chevalier Jackson, M.D., and Wm. H. Spencer, M.D. 905
Trichlorid of Iodin in Dentistry. By Milton J. Waas, D.D.S. 908
Care of Children's Teeth. By H. Anhaeusser, D.D.S. 911
Root Amputation (Correspondent's Report, Dental Society of the State of New York). By A. W. Smith, D.D.S. 914

CORRESPONDENCE

Sulfuric Acid in Root-canals 918
Professional Capability and Dental Commissions 918
Procain and Novocain Identical 919

PROCEEDINGS OF SOCIETIES

Dental Society of the State of New York 920
Eastern Association of Graduates of the Angle School of Orthodontia 928

EDITORIAL DEPARTMENT

Expansion of the Army Dental Corps 935
Classification of Dental Schools 937
Practical Hints 939
Review of Current Dental Literature 940
Periscope 945

OBITUARY

Dr. Geo. A. Maxfield 947
Dr. Lloyd A. Osborn 948

DENTAL COLLEGE COMMENCEMENTS

(Page 949.)

ARMY AND NAVY DENTAL NEWS

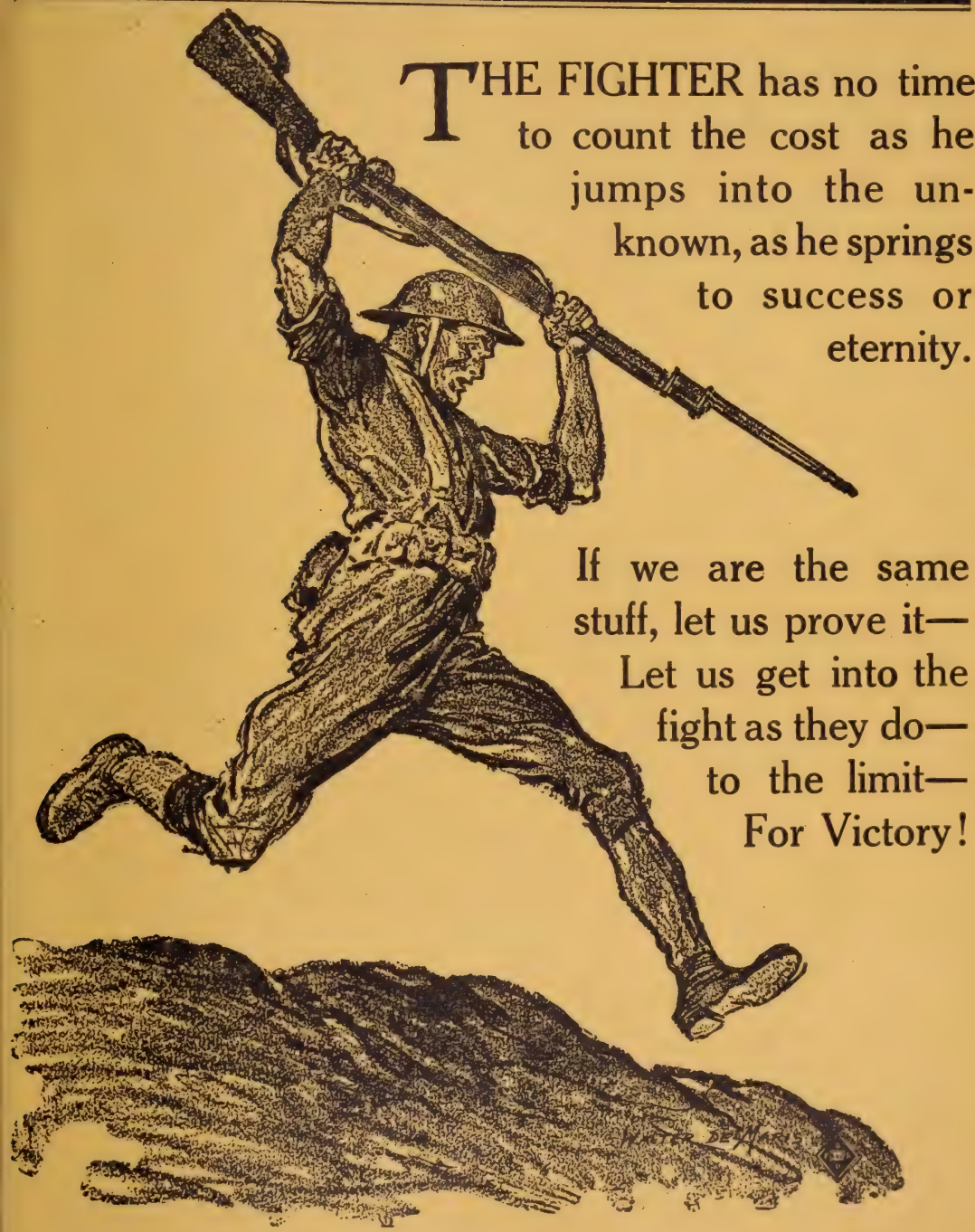
Army and Navy Dental News and Notes 950
Illustration—"Teaching Oral Hygiene to French Children" 955
Preparedness League of American Dentists 956

SPECIAL NOTICE

An Urgent Government Need: Stenographers and Typists Wanted 959

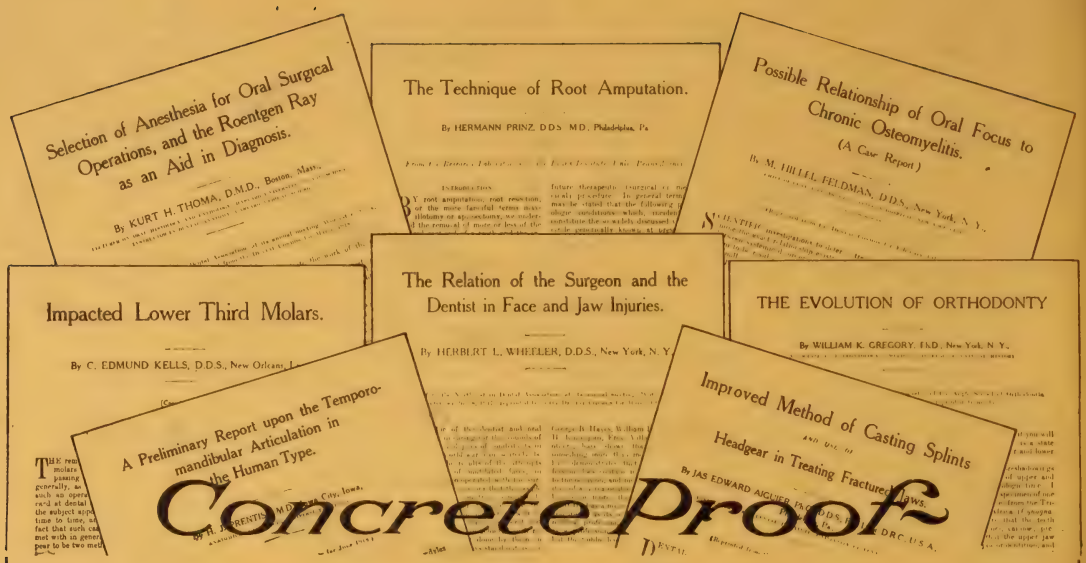
SOCIETY NOTES AND ANNOUNCEMENTS

National Association of Industrial Dental Surgeons 960
Northeastern Dental Association 960
Susquehanna Dental Association of Pennsylvania 960
Northern Illinois Dental Society 960
Forsyth Dental Infirmary for Children 960
National Mouth Hygiene Association 961
Boards of Dental Examiners 961
Monthly Record of Patents relating to Dentistry 962
Subject Index for October ..... *following* 962



Buy Bonds to your utmost—and save to your utmost to pay for them and keep them

(Space contributed by "The Dental Cosmos.")



In positive evidence of the character and accepted value of THE DENTAL COSMOS are the many requests for reprints of articles appearing in its pages. A few of the many reprints are illustrated by the titles of papers taken from the monthly issues for 1918—any one of them is worth many times the price of the journal for an entire year.

The rise of the tooth-puller to the profession of dentist has been an evolution of a century but new teachings, a new conception of the dentist's responsibilities and the recognition of his work as a major profession have taken form during the past year.

A sequence to the developments in war surgery will be a broader field for dentistry and many problems must be more seriously attacked and solved. They include Oral Surgery, Antiseptics, Root Treatment, Crown and Bridge Work, Orthodontia and the Etiology of Dental Caries.

THE DENTAL COSMOS has always been and will continue to be the forum for debate among the leading contributors to research and advancement in dentistry—the 1919 editions will record the progress of the Profession and provide you with the latest and most reliable information.

Renew your subscription now. It will keep you in step with your brother dentists in the great object of better service to humanity.

Subscription price, postage free to all parts of the United States, the Hawaiian Islands, the Philippines, Guam, Porto Rico, Cuba, Mexico, $1.00 a year; to Canada, $1.40; to other countries, $1.75.

Order through your Dealer or Direct

THE DENTAL COSMOS

Lock Box 1615 Philadelphia, Pa.

NOVEMBER 1918 VOL. LX.—No. 11

THE DENTAL COSMOS

A MONTHLY RECORD
OF DENTAL SCIENCE

Devoted to the Interests of the Profession

EDITOR
EDWARD C. KIRK, D.D.S., Sc.D., LL.D.

ASSOCIATE EDITOR
L. PIERCE ANTHONY, D.D.S.

OBSERVE REFLECT
COMPARE RECORD

PUBLISHED BY
THE S. S. WHITE DENTAL MANUFACTURING CO.
211 SOUTH TWELFTH STREET, PHILADELPHIA

Price, $1.00 a year, in advance Single Copies, 15 cents

Entered at the Post-Office at Philadelphia, Pa., as second-class matter

PRESS OF PATTERSON & WHITE CO., PHILA.

Contents for November 1918

Publication in the DENTAL COSMOS is not to be understood as indorsement—by the magazine or its publisher—of statements or opinions expressed by contributors of articles or by speakers in society discussions.

ORIGINAL COMMUNICATIONS

The Control of Focal Infections. By C. H. Mayo, M.D. 963
Procain for Dental Operations. By Stephen P. Mallett, D.M.D. 966
A Suggestion for Making Splints in Two Separate Parts and Their Union by Means of a Lock. By Alphonse N. Moufang, D.D.S. 972
The Conservation of Approximal Interspaces, Together with the Adjustment of Occlusal Relationships. By L. Ashley Faught, D.D.S. 976
Dentist or Stomatologist? By I. N. Broomell, D.D.S. 980
Nature's Tolerance and Compensating Adjustments as They Relate to Oral Restoration. By Jas. Kendall Burgess, D.D.S. 986
The Treatment of Pyorrhea Alveolaris. By C. E. Hines, D.D.S. 992
Classification of Tissue Conditions in the Mouth as Related to Efficient Dentures. By Samuel G. Supplee 996
The Influence of the War on Dentistry and Dental Colleges. By S. W. Foster, D.D.S. 1001
The Relation of Nasal and Oral Sepsis to Systemic Disease and Surgical Conditions Resulting from Focal Infections. By J. M. Guthrie, M.D. 1003
"Exodontia." By B. A. Batson, D.D.S. 1006

President's Address. (New Jersey State Dental Society.) By Raymonde A. Albray, D.D.S. 1019
War Surgery. By Thomas G. Aller, D.D.S. 1025
President's Address. (Virginia State Dental Association.) By Dr. W. H. Pearson 1033
President's Address. (Mississippi Dental Association.) By T. B. Wright, D.D.S. 1041

DENTISTRY AND THE WAR

Illustration—The Arrival of the Dentist (American Red Cross) 1009

PROCEEDINGS OF SOCIETIES

Dental Society of the State of New York 1010
New Jersey State Dental Society 1019
Virginia State Dental Association 1033
Mississippi Dental Association 1041

EDITORIAL DEPARTMENT

Rip Van Winkle, M.D. 1049
Correction 1052
Practical Hints 1053
Review of Current Dental Literature 1054
Periscope 1059

ARMY AND NAVY DENTAL NEWS

Preparedness League of American Dentists 1062
Army and Navy Dental News and Notes 1064

SPECIAL NOTICE

Platinum—Iridium—Palladium: Government regulations "limiting the sale, possession, and use of these metals and compounds thereof" 1066

SOCIETY NOTES AND ANNOUNCEMENTS

Dental Protective Association 1068
Ohio State Dental Society 1068
Boards of Dental Examiners 1069, 1070
Monthly Record of Patents relating to Dentistry 1070
Subject Index for November ..... *following* 1070

University of Buffalo College of Dentistry

Session of 1918-1919

September 24 to June 18

THE course in dentistry is one of four years. The first and second years are devoted to the fundamental studies of medicine and dental technic, while in the third and fourth years, the greater part of the time is spent in the general practice of dentistry. There is an abundance of clinical material, which gives a student a rare opportunity to become familiar with all classes of dental operations.

For further information address

Dr. Daniel H. Squire, Dean

25 Goodrich Street, Buffalo, N. Y.

What shall I do?

This is the question a recent contributor to the DENTAL COSMOS asked us the other day, when an avalanche of letters poured in on him, following the publication of his article.

He was nonplused to know how to handle this unexpected deluge of correspondence.

It shows conclusively that the DENTAL COSMOS is eagerly read and that subscribers are interested in what they read.

You know the DENTAL COSMOS is recognized as the debating ground for the master minds in dentistry; discoveries and new methods of treatment are bound to appear in its pages long before they are treated in textbooks.

If your subscription expires in December you should renew at once as we must conserve paper at the request of the Government, printing only sufficient copies for actual needs.

Keep your files complete by renewing your subscription before it expires. If you are not a regular subscriber decide now to enlist the help of this valuable magazine in your professional life next year.

No increase in subscription rates: $1.00 per year to all parts of the United States, the Hawaiian Islands, the Philippines, Guam, Porto Rico, Cuba, Mexico; $1.40 to Canada, $1.75 to other countries, postage free. Order through your dealer or direct.

THE DENTAL COSMOS

Lock Box 1615

Philadelphia, Pa.

DECEMBER 1918 VOL. LX.—No. 12

THE DENTAL COSMOS

A MONTHLY RECORD
OF DENTAL SCIENCE

Devoted to the Interests of the Profession

EDITOR
EDWARD C. KIRK, D.D.S., Sc.D., LL.D.

ASSOCIATE EDITOR
L. PIERCE ANTHONY, D.D.S.

COLLEGE OF PHYSICIANS
LIBRARY
DEC 4 1918
OF PHILADELPHIA

PUBLISHED BY
THE S. S. WHITE DENTAL MANUFACTURING CO.
211 SOUTH TWELFTH STREET, PHILADELPHIA

Price, $1.00 a year, in advance

Single Copies, 15 cents

Entered at the Post-Office at Philadelphia, Pa., as second-class matter

PRESS OF PATTERSON & WHITE CO., PHILA.

Contents for December 1918

Publication in the DENTAL COSMOS is not to be understood as indorsement—by the magazine or its publisher—of statements or opinions expressed by contributors of articles or by speakers in society discussions.

ORIGINAL COMMUNICATIONS

Sterilization of Root-canals. By Hermann Prinz, D.D.S., M.D. 1071
Primary Factors in the Etiology of Periodontoclasia. By John Oppie McCall, D.D.S. .. 1084
When Shall Root-canals be Filled, and How? By Arthur Barton Crane, D.D.S. 1093
The Next Quarter Century in Dentistry: A Prophecy. By W. D. Tracy, D.D.S. 1102
The Needs of Prosthetic Dentistry. By Norman S. Essig, D.D.S. 1108
Anaphylaxis in Connection with Asthma, Hay Fever, and Various Skin Diseases. By J. A. Turnbull, M.D. 1112
Dental Clinics in Manila. By Louis Ottofy, D.D.S., M.D. 1115
Some Experiences in the Camps and Fields of the Armies Overseas. By Major Clement A. Penrose 1119
Conduction Anesthesia. By J. N. C. Moffat, D.D.S. 1124

CORRESPONDENCE

"Sulfuric Acid in Root-canals" 1127
"Self-limiting Action of Sulfuric Acid" 1128
"Professional Capability and Dental Commissions" 1129

PROCEEDINGS OF SOCIETIES

Maryland State Dental Association 1130
Connecticut State Dental Association 1142

EDITORIAL DEPARTMENT

Dentistry in Relation to Reconstruction 1149
Bibliographical 1152
Practical Hints 1154
Review of Current Dental Literature 1158
Periscope 1162

OBITUARY

Major Harold W. Estey 1165
Dr. Wm. Henry Wright 1165
In Memoriam—Dr. Robert M. Scott 1165

ARMY AND NAVY DENTAL NEWS

Army and Navy Dental News and Notes 1166
Preparedness League of American Dentists 1169
Illustration—American Red Cross: Demonstration at Dental Clinic, St. Etienne 1170

SPECIAL NOTICE

Rescinding of the "Platinum—Iridium—Palladium" Regulations 1171

SOCIETY NOTES AND ANNOUNCEMENTS

American Institute of Dental Teachers 1172
Dental Protective Association 1172
Ohio State Dental Society 1172
Boards of Dental Examiners 1172–1174
Monthly Record of Patents relating to Dentistry 1174
Subject Index for December ..... *following* 1174
Index to Volume LX 1175

The Thomas W. Evans Museum and Dental Institute School of Dentistry University of Pennsylvania

The largest and most completely equipped dental educational institution in existence for the training of students for the practice of dentistry.

The course is graded and extends through four annual sessions, beginning the last Friday in September and ending the third Wednesday in June of each year. Every feature of practical value to the prospective practitioner is taught by a competent faculty aided by an efficient corps of demonstrators. It is the aim of the Institute to so conduct its educational work that those who pursue its courses leading to the degree of Doctor of Dental Surgery shall be thoroughly grounded in the scientific principles upon which an intelligent and skillful practice of dentistry is based. A superabundance of clinical patients affords ample opportunity for the practical training of the students in all classes of dental operations.

The laboratories and operatorium are unsurpassed in equipment. The Institute is provided with every facility of the most modern and perfect type for laboratory work in connection with every department of dental instruction as well as for advanced scientific research.

A separate department for post-graduate instruction is provided wherein practitioners and special students are offered opportunity and facilities for training in the latest developments of dental science and art.

Catalogs and circulars giving detailed information furnished upon application. Address Dr. Charles R. Turner, Dean, The Thomas W. Evans Museum and Dental Institute, Fortieth and Spruce Streets, Philadelphia.

To the Grand Jury—
Our Readers

After all, the success of the DENTAL COSMOS is in the verdict of its readers. If its policies are approved and its efforts to carry out what is held to be its mission are applauded, then the magazine is a success.

That it *is* read we have ample proof in the varied correspondence with its Editorial Department from dentists who refer to matters appearing in its pages. That it takes a position in the highest sphere of scientific literature is conceded by the fact that individuals and institutions, foremost in dentistry, are its subscribers and its contributors. That it can and does present popular, interesting and helpful subjects every month we are entitled to believe from the renewal of subscriptions and its constantly increasing circulation.

All that the COSMOS has accomplished in the past will be its guide for the future. It will continue to print dental news of consequence and it will not waste paper, ink, or what is more important, its readers' time, on trivial matters or on subjects that plainly belong to other departments of journalism.

The DENTAL COSMOS aims to be the medium for the interchange of ideas and the means for the continuance of the self education of the dentist. It renews its pledge to put forth its best efforts in the issues for the coming year.

That your success may be our success; that we may have your continued friendship and respect is our wish for 1919.

No change in subscription price, postage free to all parts of the United States, the Hawaiian Islands, the Philippines, Guam, Porto Rico, Cuba, Mexico, $1.00 a year; to Canada, $1.40; to other countries, $1.75.

Order through your Dealer or Direct

THE DENTAL COSMOS

LOCK BOX 1615 **PHILADELPHIA, PA.**

This Book is due on the last date stamped below. **No further preliminary notice will be sent.** Requests for renewals must be made on or before the date of expiration.

DUE	RETURNED
Jl 20 '34 D 27 '34	Jl 18 '34

A fine of twenty-five cents will be charged for each week or fraction of a week the book is retained without the Library's authorization.